CONSIDERING CANTERBURY CATHEDRAL II

ART SCIENCE MONEY

Bernard Sharratt

New Crisis Quarterly

CONSIDERING CANTERBURY CATHEDRAL

II

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On Yeats: Upon a House
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On Eliot: these fragments
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WINDOWS PECHAM TREASURY

Bernard Sharratt

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NEW CRISIS QUARTERLY

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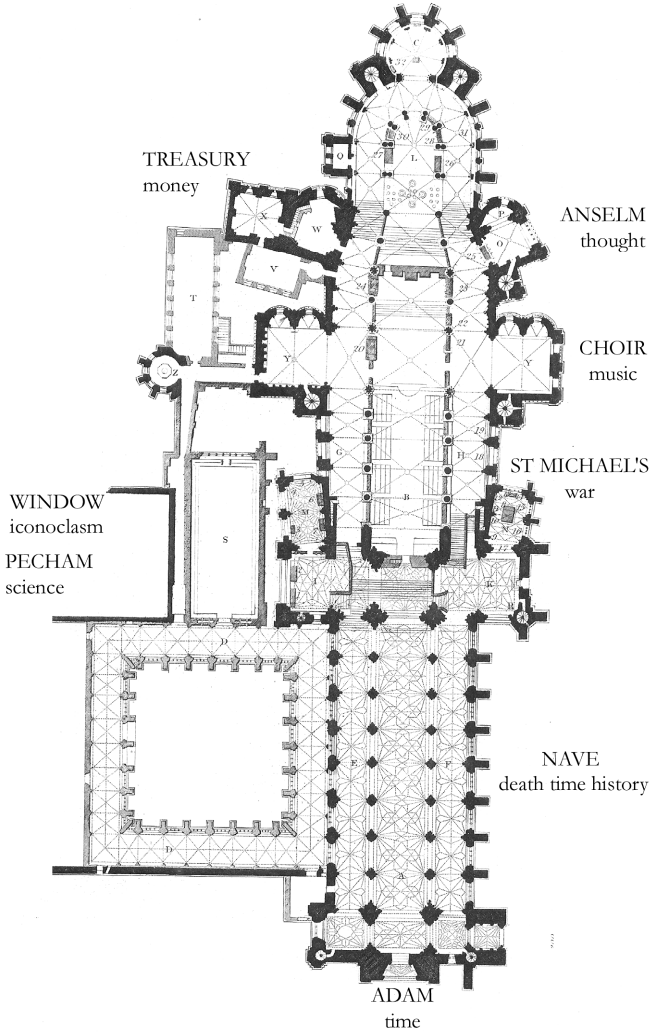
Everyone should live in their own cathedral.
(1968 Situationist slogan)

For Nicola

with love and thanks for
being yourself
and teaching me a lot


TREASURY
money
ANSELM
thought
CHOIR
music
ST MICHAEL'S
war
WINDOW
iconoclasm
PECHAM
science
NAVE
death time history
ADAM
time

Canterbury Cathedral is rather large. So is this book. What began as a leisurely stroll has grown into a fairly long walk. So, simply for convenience, this volume is now one of three. I'd prefer that you read all three, consecutively, but as with visiting the cathedral you can always skip or wander or browse what happens to interest you. Nevertheless, I hope the whole project might be read as a single rather rambling essay. Take your own time.

Works about cathedrals fall into familiar categories: tourist guide, architectural history, lavishly illustrated coffee-table book. There's also a library of scholarly studies, and numerous books on the religious function of cathedrals, their place in contemporary society, and so on. I didn't want to write any of those.

For many years I had the task, when family and friends visited Canterbury, of being the one to 'show them round' the cathedral. It's a pleasant way to spend a few hours, and I've learned a great deal, not just about the cathedral. I've also recognised that people have very different ranges of prior knowledge, so getting the tone right between stating the obvious and offering overwhelming detail is always tricky. This essay is intended to be like a conversational ramble with a patient friend, but as an old academic I can't wholly avoid a seminar or lecture mode. But what else would you expect from considering a cathedral?

In particular, I know that my own reaction, when visiting other cathedrals, is that just being told the dates of long-dead bishops, or details about the masonry, or the style of arches, doesn't seem to match what a building such as Canterbury Cathedral evokes, or clarify what the place seems to say to a visitor who is awed or impressed or puzzled by it. A cathedral invites us to think about rather large issues which are difficult to get into focus.

Meandering through the cathedral I remember T. S. Eliot's phrase about allowing a 'half-formed thought to pass'. As we drift and gaze and comment, we are half-conscious of a complex set of responses, but we're tempted simply to shrug and wander on. Trying to articulate how we are responding to this unique place takes more time than people have in a short visit.

So this is an attempt to follow through some of my own 'half-formed' thoughts prompted by the cathedral rather than simply 'about' the cathedral. I've ended up considering a variety of issues in a loose relation to different parts of the building, as the plan opposite indicates.

In the first part I tried to think about history and historians, the past, death, and time. This second part is concerned with some issues around art and iconoclasm, with aspects of the history of science, and problems about money or economics. The final third part is concerned with the odd business of thinking, and finally with music.

But how do you put a cathedral into a book?

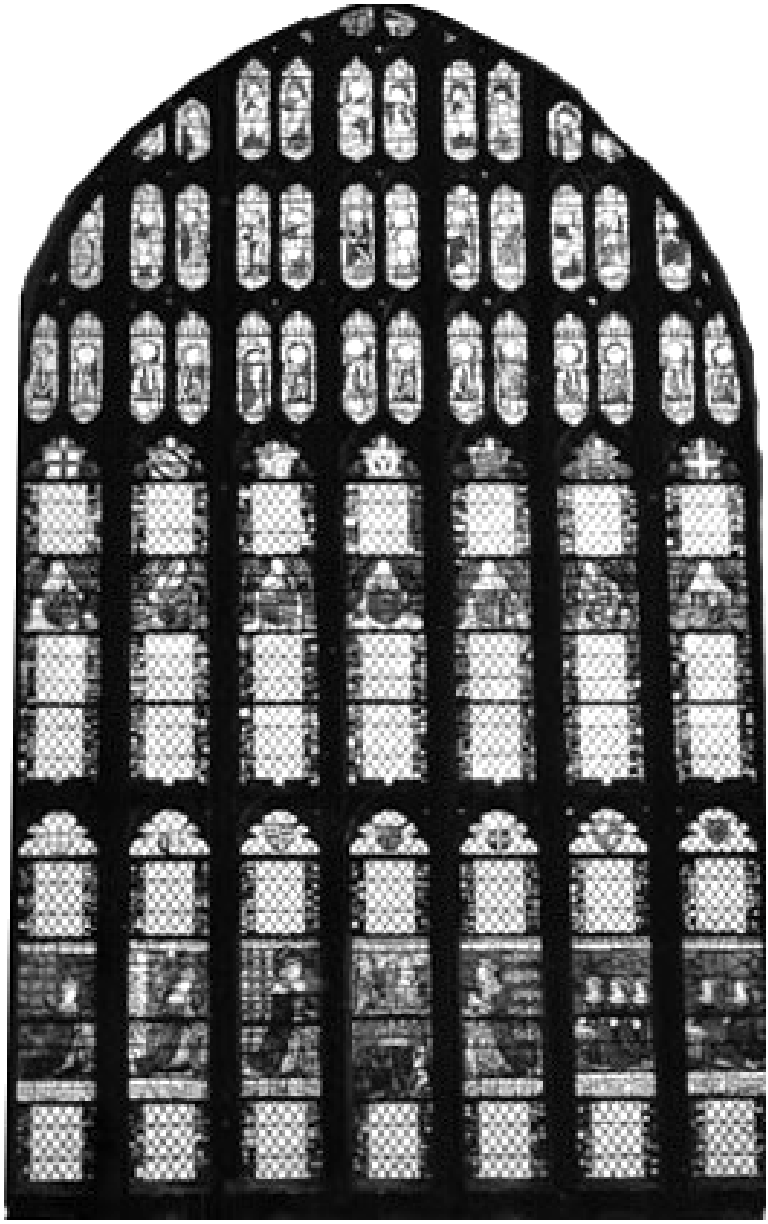
Partly by using lots of quotations. I've treated the many quotations as retrieved fragments of the past, like the surviving stones of the building itself. The essay is not intended as a scholarly work and I haven't used footnotes but hope I've given enough information on my sources to make them easy enough to find on the net. I've tried to respect the 'fair use' conventions of copyright and I use my own translations (and some by my son Paul) where possible. To have included colour illustrations would have doubled the price of the book, but it's easy to find appropriate images of the cathedral.

Not unlike wandering the cathedral itself, the essay is written as a continuing meander. So the sub-headings are simply to help you find your way about. There are many points to pause over and consider or query, but at least, unlike a real visit, you can take as much time as you like.

We are now about half-way through the Cathedral.

So, if you would care to accompany me…

ART



The North West Transept Royal Window

Standing on the top of the steps that lead up from the nave into the choir, we can look back towards the great West Window and its marvellous image of Adam. Or across into the south-west transept where the recently renovated stained-glass window glows with vivid colour and intricate ornamentation, its rich patterning of genealogical and other figures filling the enormous space.

If, however, we look the other way, into the north-west transept, we are likely to be disappointed. The corresponding window is mainly plain and rather dirty glass, with just one line of large coloured panels near the bottom of the space, some coats of arms, and a few rows of figures barely visible near the top of the window. It looks distinctly grey-scale, like the illustration above.

This is all that remains of a design originally as dense with figuration and colour as the window opposite. Usually referred to as the Royal Window, this rather dull and unattractive sight is usually passed by with barely a glance as visitors head towards the more attractive stained glass windows in the ambulatory aisles around the choir. However, it is worth pausing to consider the implications of this visibly defective window. Taking a kind of cue from the window itself, let me offer something of a mosaic, partly made up of fragments, primarily in the form of quotations, a composition of images and arguments.

The window is located at a space of transition. It directly overlooks what is known as the martyrdom, the place where Becket was murdered. It is where the Knights caught up with him, because below the window is the door through which the monks would normally enter the cathedral from the cloister. After Becket's murder it also became the spot in the cathedral to which pilgrims would process before ascending the steps into the north ambulatory which skirts around the choir and leads to the shrine.

This location was in effect an intersection between the areas reserved for the monks themselves, the cloister and the choir, and that part of the cathedral which was open to ordinary lay people, as pilgrims and visitors. Still today it is noticeable that people who wander into this particular space within the cathedral almost always show some hesitancy as to whether or not they are allowed to open the large wooden door, ancient and imposing as it is, which leads into the cloisters: they are uncertain whether the door opens onto some kind of private space to which they should not have access.

Their hesitation is a trace of a larger question. After the dissolution of the monasteries, what was the status of the cathedral itself? It had never been an ordinary local parish church but mainly the domain of the monastic community. That it was also the cathedral church of the Archbishop of Canterbury meant that there was a certain ambivalence. But did the dissolution of the monastery transform the cathedral into a parish church, or hand over the entire precincts to the local population of Canterbury?

Neither happened. The monastic buildings in the precinct became either the private residences of the Dean and Canons of the cathedral or were transformed into the Kings School, which may initially have been partly intended for local poor pupils but is now a decidedly private and expensive so-called Public School. The legal ownership of the cathedral itself devolved upon the Church of England instead of the Benedictine Order, but is the Church of England a state property or not? Who actually owns the fabric? After all, we have to pay in order to enter it, unless attending a service, though Canterbury citizens can apply for a card which allows access. And the cost of upkeep is formidable. Who should pay for it?

One overall way of understanding or characterising the dissolution was that it was essentially a privatisation by the King, a transference of enormous monastic assets to become, via the king, essentially the private property of a tiny minority of the population. Yet from another perspective one could also categorise that appropriation as a form of state nationalisation, without compensation. The underlying relevance of these remarks might be clarified if we now retrace rather summarily what happened after the dissolution and the two waves of iconoclasm which followed. I then want to explore a number of frameworks for responding to this window and to the cathedral as a whole.

Culmer

The blank glass panes in the Royal Window are the result of an act of deliberate destruction in December 1643. The person mainly responsible was called Richard Culmer and we have his own detailed account of the event, in his pamphlet *Cathedrall News from Canterbury*, published in 1644. Culmer proudly writes (all quotations are lightly modernised):

> . . then that work of Reformation went on; the Commissioners fell presently to work on the great Idolatrous window, standing on the left hand, as you goe up into the Quire: for which window (some affirm) many thousand pounds have been offered by Out-landish Papists.
>
> In that window was . . the picture of God the Father, and of Christ, besides a large Crucifixe, and the picture of the Holy Ghost, in the form of a Dove, and of the 12 Apostles; and in that window were seven large pictures of the Virgin Marie, in seven several glorious appearances, as of the Angells lifting her into heaven, and the Sun, Moon, and Stars under her feet, and every picture had an inscription under it, beginning with *gaude Maria*: as *gaude Maria sponsa dei;* that is, 'Rejoyce Mary thou Spouse of God'. There were in this window, many other pictures of Popish Saints, as of St. George &c. But their prime Cathedrall Saint-Arch-Bishop Thomas Becket was most rarely pictured in that window, in full proportion, with Cope, Rochet, Miter, Crosier, and all his Pontificalibus, And in the foot of that huge window, was a

title, intimating that window to be dedicated to the Virgin Mary. *In laudem &c honorem beatissime Virginis Mariae matris dei, &c.*

But you have a register of the Cathedrall Idolls in a late book . . This booke was a card and compasse to sail by, in that Cathedrall Ocean of Images: by it many a Popish picture was discovered, and demolished. . . But here is the wonder, that this booke should be a means to pull down Idols, which so much advanceth Idolatry.

William Somner was presumably horrified to learn that his *Antiquities of Canterbury*, published only a few years previously, had been used in this way. Culmer continues:

But as that window was the superstitious glory of that Cathedrall; as it was wholy superstitious, so now it is more defaced than any window in that Cathedrall. Whilst judgement was executing on the Idols in that window: the Cathedrallists cryed out againe for their great Diana, hold your hands, halt, halt . . A Minister being then on the top of the citie ladder, near 60 steps high, with a whole pike in his hand rattling down proud Becket's glassy bones (others then present, would not adventer so high) to him it was said, 'tis a shame for a Minister to be seen there; the Minister replyed, Sir, I count it no shame, but an honour, my Master whipt the living buyers and sellers out of the Temple; these are dead Idolls, which defile the worship of God here, being the fruits and occasions of Idolatry. Some wisht he might break his neck, others said it should cost bloud.

William Gostling in his *Walk In and About Canterbury* in 1774 adds a hostile and grimly humorous gloss to that last comment:

While he [Culmer] was laying about him with all the zeal of a *renegado*, a townsman, who was among those who were looking on, desired to know what he was doing. 'I am doing the work of the Lord,' says he. 'Then,' replied the other, 'if it please the Lord I will help you,' and threw a stone with so good a will, that if the saint had not ducked, he might have laid his own bones among the rubbish he was making; and the place, perhaps, had been no less distinguished by the fanatics for the martyrdom of Richard Culmer, than by the Papists for that of St.Thomas Becket, though his relics might not have turned to so good an account.

Despite such malicious stones deliberately thrown at him, Richard Culmer continued with his catalogue of destruction, and not just of this window:

Many other Images were defaced in other windows there, severall pictures of God the Father, of crucifixes and men praying to crucifixes,

and to the Virgin Marie; and Images lay on the tombs, with eyes and hands lifted up, and right over them was pictured God the Father, embracing a crucifix, to which the Image seemed to pray. . .

There were also many huge crosses demolished, which stood without the Cathedrall, four on Bell-Arundell steeple: and a great Idoll of stone, which stood on the top of the roofe of that Cathedrall, over the South door, under Bell Harry steeple, was pulled down by 100 men with a rope: in the fall it buried itselfe in the ground, it was so heavy, and fell so high.

This Image held a great brazen Crosse in his hand; it was the Statue of Michael the Arch-Angel, looking straight to a lane right over against it, in Canterburie, called Angell-Lane.

There was demolished also, a very large stone Image of Christ, over which was the Image of the Holy Ghost, in the forme of a Dove: this Idoll stood right over the great Cathedrall South-Gate next the Bull-stake: this Image was pull'd down with ropes: at first the head began to shake and nod to and fro, a good while: at last it fell off two houres before the body, which was rivetted to the wall with iron barres. The Papists report it was a miracle, that the Image nodded the head to reprove those that pulled it downe, one said then, it was a shame they should pull it downe in such a base manner.

This Image (amongst the rest) was the meanes of much Idolatry; men, now living, testifie, that they have seen travellers kneele to it in the street, as they entered the Cathedrall, which is continually visited by Outlandish Papists, who daily commit Idolatry in that Cathedrall; and yet how many that profess love to true Religion, and hatred of Idolatry, are now zealous for these Images, which are monuments, and instruments, and occasions of Idolatry, the continuance whereof hath bin our great sin, shame, and misery?

Culmer and his associates completed the work of Colonel Sandys' men in 1642, who had fired upon that same image high upon the Christ Church Gate. The recent statue of Christ now in the centre of the Christ Church Gate is the long-delayed replacement for that destroyed 'idol'. We don't know exactly how many of the other statues in the numerous niches around the Cathedral were also destroyed, but those visible on the exterior today are largely the work of a decidedly mediocre 19th-century Belgian sculptor. Culmer proudly lists at least some of the 'idols of stone' that were 'demolished that day':

13 representing Christ and his twelve Apostles, standing over the West door of the Quire were all hewed down and 12 more at the North door of the Quire, and 12 Mytred-Saints set aloft over the West door of the Quire, which were all cast headlong and some fell on the head and their Myters brake their necks.

Culmer's account ends:

> The last execution against the Idols in that Cathedral, was done in the Cloysters, divers crucifixes and mitred Saints were battered in pieces there: St. Dunstans Image pulling the Divel by the nose, with a pair of tongs, was pulled down, Devill and all. . . And as the monuments of Idolatry are in great part taken out of that Romish Cathedrall; So that Cathedrall nest of Prelaticall Hornets, is almost dispersed and gone; God had scattered the proud. And now to end (with good Cathedrall newes from Canterburie) the Honourable House of Commons hath begun to settle an able & Orthodox Ministry in that Cathedral, where two Sermons are preached every Lords day beside the week dayes preaching there: light comes in there through the windows, where the painted Images stood, and kept it out.

Culmer concludes with this reference to light, now in his opinion clear and bright rather than tainted with colour and sacrilege. He would presumably have approved of the message of one of the windows in the north choir aisle, which depicts Christ leading the Gentiles away from the worship of pagan idols. Yet, bizarrely, the image of the idol itself, looking very much like a mediaeval devil, was left intact while the figures of the Christ child, the Virgin Mary, and the three Magi in the same window were literally de-faced, though now restored.

Clearly, Richard Culmer would not have appreciated Bede's account of Saint Augustine arriving in Canterbury in 597 and proclaiming his mission by carrying aloft on a banner an image of Christ. The 'Image of this Arch-Prelate of Canterbury was the first that was demolished in that Cathedral.' And though Culmer left the images of royalty intact in the Royal Window he would definitely not have approved the last will and testament of Henry VIII's father:

> If it be not performed by our self in our life, we will that our executors cause an image of silver and gilt, of like fashion and weight as is the image that we have caused to be made to be offered and set before our Lady at Walsingham, to be made, with this Scripture, *Sancte Thomae, intercede pro me*. The same image for a perpetual memory to be made, offered, and set before Saint Thomas of Canterbury, in the metropolitan church of Canterbury, in such place as by us in our life, or by our executors after our decease, shall be thought most convenient and honourable, and as nigh to the shrine of Saint Thomas as well may be.

King Henry VII might not, in turn, have much approved of Richard Culmer.

Looking at it today, we can briefly clarify what was destroyed in this particular window and what was left untouched. The highest rows which were presumably beyond the reach of Culmer, even on his sixty-foot ladder, still include ten figures with inscriptions indicating that they are Old Testament prophets, then a row of the twelve Apostles, another of named archbishops of Canterbury together with a number of Saints and Popes, and a line of Angels bearing coats of arms.

The surviving row which is now in the middle of the window has the figures of King Edward IV and his wife Elizabeth Woodville facing each other in the centre, each praying at a *prieu dieu*, with their two sons flanking them on one side and their five daughters on the other. The two young boys, Edward Prince of Wales and Richard Duke of York, were the 'Princes in the Tower' infamously murdered in 1483. All these children were declared illegitimate by Parliament in 1484, though the young Princess Elizabeth was to marry King Henry VII in 1486, another instance of the vagaries of Royal 'succession'.

One shield carried by an angel has the coat of arms of King Arthur, reminding us again of the Prince Arthur whose premature death was to promote his younger brother Henry to become King Henry VIII. These surviving Royal figures were once situated in the lower rows of the window and therefore well within range of Culmer's destructive pike. Presumably he did not (yet) regard such royal icons as idols.

Culmer's primary targets were the 'idolatrous' representations of God the Father, and of the Holy Ghost as a dove, the large central crucifix, and representations of the 'Seven Joys of the Virgin', the traditional most important seven moments in the life of Mary as the mother of Jesus. The targeting of Thomas Becket and other saints was partly based upon objections to praying for the dead, and therefore hostility to any images of saints as encouraging their invocation, but also because of the accusation that such images were the object of direct idolatrous worship. That Culmer left intact the Royal images was in accordance with a Parliamentary ordinance of 26 August 1643 which he claimed as the official authorisation for his action: *Ordinance for demolishing superstitions images, etc., and removing Communion Tables from the East End of Churches, before 1 November 1643.*

> Be it further Ordain'd that all and every such removall of the said Altars, Tables of stone, Communion Table Tapers Candlesticks and Basons, Crucifixes and Crosses, Images, and Pictures as aforesaid, taking away of the said Rails, levelling of the said grounds, shalbe done and performed, and the walls, Windowes, Grounds, and other places which shall be broken, impaired or altered by any the meanes aforesaid,

shall be made up and repaired in good and sufficient manner, in all and every of the said Parish-churches or Chappels, or usuall places of publick Prayer belonging to any Parish, by the Churchwarden, or Church-wardens of every such Parish for the time being respectively; And in any Cathedrall or Collegiate Church or chappell, by the Dean or Sub-Dean, or other chiefe Officer of every such church or chappell for the time being; . . .

Provided, that this Ordinance, or any thing therein contained, shall not extend to any Image, Picture, or coate of Armes in Glasse, Stone, or otherwise; in any Church, Chappell, Church-yard or place of publick prayer as aforesaid, set up or graven only for [printing illegible] ment of any King, Prince, or Nobleman, or other dead person which hath not been commonly reputed or taken for a Saint: But that all such Images, Pictures, and coates of Armes may stand and continue in like manner and forme, as if this Ordinance had never been made.

The ordinance indicates the scope of of the authorised destruction, but the fact that the Dean and Chapter or local parishioners would be liable to pay for repairing any physical damage was not the only reason why Culmer's work had to be conducted behind the locked doors of the cathedral and he needed an armed escort provided by the Puritan Mayor of Canterbury. His actions even if condoned or ordered by parliamentary decree were not necessarily endorsed by the majority of the city which, like many other communities, was significantly divided during the civil war which was already unfolding and in which iconoclasm was to play a significant role. For some in later generations, Culmer was to be known as 'the most hated man in Kent'.

Culmer's *Cathedrall News from Canterbury* is an almost unparalleled instance of an English iconoclast recounting his own activities. It immediately prompted at least two polemical ripostes, *The Razing of the Record,* in 1644 and *Antidotum Culmerianum*, in 1645. There is also, almost ironically, a near-contemporary visual depiction of the iconoclastic efforts in Canterbury Cathedral: an oil painting of the choir showing the windows in the south aisle being smashed and the choir stalls attacked by men with axes. It was painted by Thomas Johnson, probably about 1657, who also provided images of Canterbury cathedral to be printed in Sir William Dugdale's *Monasticon Anglicanum.*

In 1643 Culmer was a recent and rather minor cleric of the cathedral. He had been expelled from his curacy in the parish of Harbledown after complaints by parishioners, and was appointed as one of the Six Preachers, a cathedral sinecure. He was locally known as 'Blue Dick' because, it was said, he always dressed in blue, refusing to wear what he regarded as Papist black clerical costume. Throughout the 1650s he was to be involved in ongoing disputes with his congregations in various parishes, mainly over the issue of tithes, about which he published another fiery pamphlet. In 1657

his son distributed a defence of Culmer senior's life entitled *A Parish Looking-Glasse for Persecutors*. A polemical riposte was aptly, if lengthily, entitled: *Culmers Crown Crackt With His Own Looking-Glass, or, The Cocks-combs looking-glasse broken about his ears and a counter-mirror held forth to all good people, for their undeceiving in the pretended sufferings of that pseudo-martyr, and grand imposter of this age, Blew Dick of Thanet*. Clearly, his smashing of the Cathedral windows in 1643 had not been forgotten. He died in 1662.

Culmer's brief but memorable career should be put in the general context of the civil war, during which the destruction of stained glass or statues might be regarded as a relatively minor matter compared with the thousands of fatalities. But the very nature of a civil war is perhaps brought home precisely by the intensely local character of the ongoing conflicts legible in the various pamphlet exchanges involving Culmer. For example, when the attempt was made to ban Christmas festivities in 1647:

> At Canterbury, he [Culmer] coming thither from London about Noon upon the 25th day of December, 1647, called Christmas-day; and being in his Inne, a tumult was made in the streets against godly men which opened their Shops that day; and when Mr. Culmer heard the Maior was knockt down, he was running out to help the Maior: But Mr Joseph Phillips at the sign of the Saracens-head, shut his doors, and he and his men laid hands on Master Culmer, and kept him in, and a little after he was perswaded to ride out at the back gate; But he was not gone half a quarter of an hour, but the Rioters came in, and searched for him, and would not be perswaded but that he was in the house, and swore, They would hang the Round-headed Rogue; and afterward he was informed, they would have hanged him over the Cathedral-gate, where he helped to pull down the large Image of Christ, with the holy Ghost in form of a Dove over his head, in full proportion.

There were several other potentially violent disputes with his parishioners:

> . . when Mr. Culmer reproved them for setting up a Tree May-pole, it was told him to his face, That there was a Bough strong enough to hang him on it.

> . . he was much reviled because he did not officiate at the grave: but he said, he would not be Chaplain to the wormes, to say grace to them before they go to dinner and feed on the dead corps: upon this account he was threatned to be buried alive.

His hostility to sacrilegious pictures was immediately signalled when he was appointed as Vicar of Minster:

> And when Mr Culmer came to the Vicarage-house, there was a large Picture of a man in the window, and underneath it was written, *Salvator mundi*, the Saviour of the world. But Mr Culmer said before many present, This is not the Saviour of the world, for it cannot save itself, and thereupon dashed it in pieces;

The whole Culmer business could of course be regarded simply as a local flurry in an intensely turbulent period, an ephemeral anecdote or even an entertaining footnote, mere spent passion and violent rage, all best forgotten – were it not for its visible residue in that almost blank window, still confronting us and perhaps prompting puzzled or uncomfortable reactions and thoughts. T. S. Eliot once remarked: 'The fact is simply that the Civil War of the seventeenth century . . has never been concluded. The Civil War is not ended: I question whether any serious civil war ever does end.' With that in mind, it is worth tracing some of the possible after-effects of English iconoclasm.

crimes against culture

In recent years the iconoclastic activities of various ethnic cleansers and religious fundamentalists have been widely reported by an often appalled but somewhat uncomprehending Western media. The Ferhadija Mosque, in Banja Luka, Bosnia, was demolished by Serbian militiamen in 1993, on the Serbian Othodox holiday of Đurđevdan (Saint George's Day). The huge Bamiyan Buddhas were dynamited by the Afghanistan Taliban regime in 2001, when Mullah Mohammed Omar exulted that "Muslims should be proud of smashing idols" whereas the Director General of UNESCO lamented the destruction as a "crime against culture." Several car bombings were directed at the golden-domed Imam Abbas mosque and the Imam Hussein shrine in the Shia city of Karbala in 2007.

In September 2010, the Reverend Terry Jones of Gainesville, Florida, announced that he would burn a *Qur'an* on 11th September; so, in October that year, the congregation in the Syriac Catholic cathedral in Baghdad were massacred by Isis gunmen proclaiming "We are avenging the burning of the *Qur'an*." In 2012, the Al-Qaeda-linked Ansar Dine group in northern Mali destroyed 15th-century Sufi shrines in Timbuktu, in explicit response to UNESCO having placed Timbuktu on its list of 'endangered heritage sites': the group's spokesman declared that they were acting "in the name of God" and that "God is unique. All of this is *haram* [forbidden in Islam]. We are all Muslims. UNESCO is what?" The list could, and will, continue.

In our response to such events, we tend to forget the history of Europe's own iconoclastic movements, including the various destructive campaigns waged in England. Alongside the Canterbury events just instanced, we can sample the journal of another English image-breaker, which gives us a tersely bureaucratic record rather than Culmer's vivid personal account.

First published in the 18th century, the *Journal of William Dowsing, Parliamentary Visitor, appointed under a warrant from the Earl of Manchester for demolishing the superstitious pictures and ornaments of churches &c within the county of Suffolk, in the years 1643 – 1644* begins as follows:

> SUDBURY, Suffolk. Peters Parish. Jan. 9th, 1643. We brake down a Picture of God the Father, two Crucifix's, and Pictures of Christ, about a hundred in all, and gave orders to take down a Cross off the steeple and diverse Angels, 20 at least, on the Roof of the Church.
> SUDBURY, Gregory Parish, Jan. the 9th. We brake down 10 mighty great Angels in glass, in all, 80.
> ALLHALLOWS, Jan. the 9th. We brake about 20 superstitious Pictures; and took up 30 brazen superstitious Inscriptions, *ora pro nobis*, and *pray for the soul*, &c.

There are a further hundred and forty-eight similar entries, meticulously dated and exultingly detailed. For example:

> BUERS, Feb. the 23d. We brake down about 600 superstitious Pictures, 8 Holy Ghosts, 3 of God the Father, and 3 of the Son. We took up 5 Inscriptions of *quorum animabis propitietur Deus*; one *pray for the soul*. And Superstitions in the Windows, and some divers of the Apostles.

Several months later, the final entry reads:

> PARHAM-HATCHESON, Oct. 1st. There was 21 Cherubim with Wings, in Wood; and 16 superstitious Pictures, and Popish Saints; with a double Cross in the church; and the representation of the Trinity on the Font; and the Spears and Nails, that Christ was pierced and nailed with; and 3 Crosses, all in stone; 4 superstitious Pictures in the Chancel, and a Cross, all in Glass; and the Steps to be levelled, by Mr Francis Warner, by Oct. 15th. All to be done.

Nor was it only images which were thus attacked and destroyed during the long Reformation from Henry VIII to Oliver Cromwell. To recall just two examples: in London in 1538 a Franciscan Friar was publicly burned alive alongside a supposed miracle-working effigy, and in the 1640s the site of the old Charing Cross, which had been demolished as sacrilegious, was used for the burning of books. Canterbury has a Forty Martyrs Road, commemorating Protestants executed under the Catholic Queen Mary. And so on.

We might therefore simply register the Culmer incident in Canterbury as occurring within a broader context of English iconoclastic activities, in an

extended conflict over images from at least the 14th-century Lollards onwards. This in turn could be located within a much longer and indeed almost global history of contests over the meaning and legitimacy of religious images, including official or state-sponsored iconoclastic campaigns as well as outbreaks of popular or unauthorised image-breaking, not only in, say, 8th-century Christian Byzantium but also within both the Judaic and Islamic traditions. However, simply recognising a history does not explain the rationale for such activity, or clarify its continuing resonance.

biblical proofs

There have been several theological and other intellectual objections to, and counter-defences of, images. Within the Christian tradition the interpretation of specific biblical texts has often been central, sometimes engendering complex exegetical arguments, for example disputes concerning the thirty or so different Hebrew words which can be variously translated into such English words as 'icon' or 'idol'. Most often, however, such scholarly inquiries have been ignored by quasi-fundamentalist appeals to specific Old Testament injunctions, sometimes understood only in contested translations.

Richard Culmer's own justification can be regarded as representative of a literalist attitude which was influential in England at various times, particularly during the reign of Edward VI and the Cromwellian interregnum. He cites, or simply references, familiar 'proof-texts' from the Old and New Testament on images:

> But (say some) the Windows and Monuments are precious; but we read Deut. 13.6. If any (though never so near or dear unto us) move us to Idolatry, we are commanded by God himselfe, to stone them to death, our eye must not pity them: Must we not spare a living man, made little inferiour to the Angels, but must rend and maul him with stones, and shall we stomack the battering and defacing of dead Images, that are not only monuments of, but inticements to, Idolatry? shall we glamour and clamour as they, that shall lament the finall fall of Babylon, Rev. 18, 16. Alas, alas, that great Citie, that was clothed in fine linnen, purple & scarlet & decked with gold & precious stones, shall we say alas that great Cathedrall, oh the goodly painted windowes, oh the golden Tabernacle work, oh the Glorious Glory cloth, oh the costly Copes, Basins, and Candlesticks; oh the rich Hangings, oh the Arch-Bishops consecrated Chaire; Such clamours were heard when the Abbyes were defaced, but wee read Acts 19, 19: That they which beleeved, did quite abolish their superstitious devices, how curious and costly soever, though they were worth 50000 pieces of silver: let those that cry out against this Reformation, read these (and the like) places of Scripture : Exod. 24, 24.

Num. 33, 52. Deut. 7, 5. 1. Kings 15, 12. 2. King. 18, 4. 1. Isa. 30, 22. I. Joh. 5, 21.

It is perhaps difficult for the modern reader's eye not simply to glaze over at this list of references, but they would have been familiar to many of Culmer's contemporaries.

However, as the earlier debates around Byzantine iconoclasm had clearly shown, it was equally possible to assemble a catena of passages from the Bible and from the early Christian Fathers to support the orthodox or traditional defence and justification of images. This position had been most emphatically formulated and amply documented by St John of Damascus in response to the 8th-century Byzantine iconomachia, and his deployment of biblical and patristic texts provided a precedent for many subsequent arguments. Most of which assumed, on both sides, that the biblical text had a decisive authority in the matter. Even if the biblical text itself was clearly liable to critical and contested scrutiny, as in the two different accounts in *Exodus* and in *Deuteronomy* of the allegedly divine words directly defining the so-called Ten Commandments, including the injunction against graven images.

We can briefly sketch the (more or less fuzzy) logic underlying the Old Testament injunctions. The fundamental premise was twofold: that there is only one God and that He is 'our God', the God of Israel. It followed that 'we' are special ('chosen') because our God is special, indeed unique. But this premise might be otherwise articulated: that it is because we are (already) special that our God is special, that Israel's God is different from and superior to all other gods, those of quite other tribes who worship 'false gods', because *we* are different and superior. The decisive evidence offered is that the gods of other tribes are made by men, and accordingly they are physical material, images, statues, objects. Whereas Israel's God, by contrast, is invisible, not embodied in any physical image or object and therefore not able to be depicted at all. This might even mean that other tribal gods are not simply less powerful than Israel's but that they are not gods at all.

However, there are some further possible variations. That what was taken to be a 'false god' may not to be a 'god' but some other kind of entity, a diabolical being or 'devil', an evil spirit or the manifestation of satanic powers. However, any equation between a physical object or figure and the alleged false god could also be denied: the image, it might be claimed, simply 'represented' a god who existed in some quite other form, just as invisible perhaps as Israel's alleged god. Alternatively, of course, it might be argued that none of the contesting tribal gods are actually gods, including Israel's own.

There were varying implications of these positions. Clearly, if only one god was a real god and the other gods 'false' then the corresponding tribal priesthoods were respectively true and false. But what if one's own

priesthood, or ruler, were to worship a false god, instead of or even in addition to the real god? And what of some other tribes who might – under what circumstances? – want to acknowledge or even worship one's own god? How, after all, could one tell which was the right god unless one merely assumed that one's own tribe or community was the chosen one? But other tribes also regarded themselves as special. Perhaps only the correct god could actually tell us the truth? But how? By victory in battle? By miracles? Or in words, preferably words not made by men, not physical objects themselves. Though perhaps graven tablets were an exception?

By the time the Old Testament texts were being critically pondered in seventeenth century England, some of these premises and implications had become deeply problematic. Not least because in the sequence of monarchs from Henry VIII to Charles I, with their shifting religious allegiances, one or more would have to have been judged idolatrous.

Henry Clarke

Let me here offer some passages from an interesting tract by Henry Clarke, entitled *A Rod Discovered, Found, and Set Forth to Whip the Idolaters*, published in 1657. He begins with a fierce certainty that idolatry is afoot, but his explanation, in terms of imagination being given a material form, introduces another logic:

> When man hath forsaken the counsel of the Lord, [*Deut. 9.12, 16. Exod. 32.1, 8. Psal. 106.13, 21. ver. Numb. 25.4 Iudg. 2.10, 11*] and turned from the onely true God his Maker, then . . in his imaginations he sets up other Gods for to worship and serve; and this hath been the practise of the Kings and Rulers of the Earth (and their Priests) . . to fall down and worship the gods that they in their imaginations have set up, which is Idolatry. So likewise the Kings and Rulers of the Earth have done, and do now in these dayes, for the worship and service of their false gods..

Deploying a familiar Old Testament precedent or parallel, Clarke has a particular objection to cathedrals:

> Now was not Manasseh one that did forsake the Lord and his commandments, and did not he lead the peoplc on, & seduced them to do wickedly in serving strange gods, and worshipping Idols in the houses of high places? and thus you may see that the ground and foundation of the houses of high places (which we in England call Cathedral Churches, Churches and Chappels) was from the heathen and Idolatrous Kings and Rulers, and popish Kings, and others, built up to worship their Idols in; & now in these our days are upheld in pretence to worship the true God in; but I say, that God dwells not in temples made with hands, neither is

he worshipped in them with those that assemble together in them, for God is a Spirit, and is worshipped in spirit and in truth.

But does this mean that God as 'spirit' simply cannot be imaged or even imagined and that indeed all imaginings may be dangerously akin to idolatry? Clarke traces the entire history of English religion as a sequence of Old Testament-like fallings away from the true worship and, for him, even after the Henrican Reformation the 'high places' are still only partially cleansed of idolatrous images:

> They are not yet reformed of all those PICTVRES and Images, for still there remains the PICTVRES of men, women, and children in many of them, and especially, in and about London, of Kings and Queens, Earls, Lords, Ladyes, and their children, and others; and in many places there is made by the Painters and others the likenesses of Angels, Eagles, Doves, Lyons, Wolves, Hinds, Asses, Snakes, & the likeness of Boughs, or Trees, and the likeness of Water, and the likness of the Sun, Moon, Stars and Firmament: And their Churches, so called, are places of vanity, and lightness, and pleasures still; and likewise they are places of false Worship.

But if this is still the case, this lack of a complete Reformation has further implications:

> And what reformation was this? none at all: for all this which they took away from the Pope, in a manner was settled upon King Henry the 8th. For first, they made him Head of the Church, as they called it, instead of the Pope . .

In particular:

> Now for my part I see that none of the poor common people were ever the more eased of their burdens, (onely the King and the Bishops, with the rest of the Clergy) except their paying of Peter-Pence to the Pope, and that was none at all, because now the Priests have a Penny for the smoke of every Chimney, as the Pope had.

The implications become ever clearer:

> They have left the High places (falsely called Churches) standing still, with the priests belonging to them, and the Glebe Lands, the Parsonages, and the Vicarages, and the Laws that the pope and popish Kings made to oppress the people by, with paying of tythes, and suing men at Law for tythes and imprisoning men for non-payment of tythes, & made an Ordinance for the taking treble damages by distresse of mens goods for non-payment of tythes; all this still remains undone and unreformed still

> by this present power that now rules; and all those Judges and Justices in whom the Devil rules, are protected, who casts some of us (the people called Quakers) into prisons . .

So, Clarke's true community or tribe are (parenthetically) the 'Quakers', and arrayed against them are those 'whom the Devil rules'. And what began as an Old Testament objection to false images and idols rapidly turns into a repudiation in the name of the one Lord Christ of all unacceptable social and political structures in the present:

> So own Him to be to us both King, Law-giver, Judge, and Priest, and deny all Laws that are made in opposition to him, who has changed the priesthood and disanulled the Law, even Christ Jesus, the same yesterday, to day and for ever, who is over all, God blessed for ever, Amen. But I say, all those that make Laws for to pay tythes, and all they who by those Laws require or force people to pay tythes; and all they who do pay tythes, and all they who receive tythes, priests or improprietors, deny Christ Jesus by their works to be come in the flesh, and set at naught what he hath done upon the crosse, and so likewise by their works own him not to be unto them neither King, Law-giver, Judge, Priest, nor Redeemer, and so they all agree together, and set themselves against the Lord and against his anointed.

By the end of his tract, Clarke has repudiated universities, lawyers, doctors, parish priests:

> So that it is plain, That the Parish-Priests of the Nations, called by the world their Ministers, buy their Power, their Gifts at the Vniversities, of men, for a sum of money, Simon Magus-like, that they preach for hire, and study or divine for money: Therefore they who are made Ministers at Cambridge and Oxford are the worlds Ministers, and not Christs Ministers.
>
> . . And again, leave off going to ask counsel of the Lawyers, neither do ye take counsel of them, for so long as ye take counsel of them, ye will never keep money in your purse, nor your selves be at peace. . .
>
> . . And again I say people, Cease from the Doctors, for so long as ye follow them, ye will never enjoy your healths, and come to God who sent his Word and healed the people. . .

Perhaps most cogently, and dangerously, Clarke questions the very foundations of power in England:

> But some . . Will say that the Kings gave their own lands to the Clergy. But I say, How came the Saxon Kings by their Lands here in England that they gave to the Clergy? Did they not take it from the people by their Swords? And did not William the Conqueror do the like? And did not the Saxon Kings and William the Conqueror prove tyrants to the people and treacherous likewise?

The tract ends: 'And so it is concluded'. But perhaps not. We are perhaps reminded of Jack Cade.

Richard Culmer may have been content to leave King Edward and his Queen intact. Others were not. When Charles I was executed in 1649 it was not entirely inappropriate that his sycophantic supporters published a defence of his status as saint and martyr under the title *Eikon Basilike*. Images Ruled, OK? Milton's counter justification of the execution was correspondingly entitled *Eikonoclastes*.

Erasmus & pilgrimage

In 1657 Clarke saw the Henrican reformation as incomplete, even as a betrayal. If we now return to an earlier phase, perhaps during the relative calm just before the real storm, we can look briefly at a more famous text, and from one perspective a definite precursor to Culmer's vitriolic pamphlet.

One of the colloquies of the great humanist scholar Desiderius Erasmus was entitled *Peregrinatio religionis ergo* or *A Pilgrimage for the sake of Religion*, first published in the 1520s. This recounts a visit to Canterbury, probably around 1511, by Erasmus in the company of the leading English humanist, John Colet, headmaster of St Paul's school. Erasmus's text describes the martyrdom area of the cathedral, immediately in front of the window we have been considering, which was then of course still intact, including the great image of Becket himself overlooking the site of his death, though Erasmus does not comment on the window itself:

> At that spot is shown a wooden altar dedicated to the holy Virgin, but mean, and not remarkable in any respect, unless as a monument of antiquity, putting to shame the extravagance of these times. There the pious man is said to have breathed his last farewell to the Virgin, when his death was at hand. On the altar is the point of the sword with which the head of the most excellent prelate was cleft, and his brain stirred, that his death might be the more instantaneous. The sacred rust of this iron, in love of the martyr, we religiously kissed. Leaving this spot, we descended to the crypt. It has its own priests. There was first exhibited the perforated skull of the martyr; the forehead is left bare to be kissed, whilst the other parts are covered with silver . . There also hang in the dark the hair shirts, the girdles, and bandages, with which that prelate

> subdued his flesh; striking horror with their very appearance, and reproaching us for our indulgence and our luxuries.

But then, in the Treasury, 'Gratian Black' (Colet) evinces a less reverential reaction:

> When an arm was brought forward which had still the bloody flesh adhering to it, he drew back from kissing it, and even betrayed some signs of disgust . .

– and then further offends the attendant priest who has just shown them 'the whole figure of the excellent man, gilt, and adorned with many jewels' by querying whether the Saint Thomas who had so favoured the poor during his lifetime would not have taken it 'very contentedly'

> if any poor woman, having starving children at home, or daughters in danger of prostitution from want of dowry, or husband laid up with disease, and destitute of all assistance, should first pray for pardon, and then take from these so great riches some small portion for the relief of her family, as if receiving from a consenting person, either as a gift or a loan?

This predictably prompts a tense discussion of ecclesiastical wealth. Finally, in the sacristy they are shown:

> some torn fragments of linen; and most of them retaining marks of dirt. With these, as they told us, the holy man used to wipe the perspiration from his face or his neck, the runnings from his nose, or such other superfluities from which the human frame is not free. At this exhibition my friend Gratian again incurred some little disapprobation.

He disdainfully and even disgustedly declined this very privileged offer of one of these pieces of soiled but sacred linen. The visit to Canterbury ends at the Harbledown hospital for old men, where – as a final straw – they are invited to kiss the alleged shoe of Saint Thomas.

Some of this account was printed in English translation in 1537, perhaps deliberately as a well-timed contribution to the propaganda campaign by Thomas Cromwell to vilify monasteries and to justify the imminent confiscation of the gold and jewels of Becket's shrine. (Incidentally, the Canterbury printer John Mychell published two of Erasmus's colloquies in 1550 but not the *Peregrinatio*.)

Other writings of Erasmus were to provide further ammunition for the Henrican and later reformers. The *Peregrinatio* colloquy begins with a visit to Walsingham and includes a wonderfully satiric letter supposedly from the

Blessed Virgin herself, deploring the flood of invocations she wearily has to deal with and proclaiming her personal support for Luther's campaign against prayers to the saints for intercession: an overworked Mary complains of the burden imposed, above all, upon herself!

In *The Praise Of Folly*, or *Encomium Morae*, despite its playful titular dedication to his close friend Thomas More, Erasmus poked fun at various pious practices involving images. Speaking in the *persona* of Folly, a patently false divinity, he compares the followers of Folly to those who :

> attribute strange virtues to the shrines and images of saints and martyrs, and so would make their credulous proselytes believe, that if they pay their devotion to St. Christopher in the morning, they shall be guarded and secured the day following from all dangers and misfortunes: if soldiers, when they first take arms, shall come and mumble over such a set prayer before the picture of St. Barbara, they shall return safe from all engagements: or if any pray to Erasmus on such particular holidays, with the ceremony of wax candles, and other fopperies, he shall in a short time be rewarded with a plentiful increase of wealth and riches. The Christians have now their gigantic St. George, as well as the pagans had their Hercules; they paint the saint on horseback, and drawing the horse in splendid trappings, very gloriously accoutred, they scarce refrain in a literal sense from worshipping the very beast. What shall I say of such as cry up and maintain the cheat of pardons and indulgences? that by these compute the time of each soul's residence in purgatory, and assign them a longer or shorter continuance, according as they purchase more or fewer of these paltry pardons, and saleable exemptions?

Folly pointedly asks:

> to what purpose should I demand the sacrifice of frankincense, cakes, goats, and swine, since all persons everywhere pay me that more acceptable service, which all divines agree to be more effectual and meritorious, namely, an imitation of my communicable attributes?
>
> I do not therefore any way envy Diana for having her altars bedewed with human blood: I think myself then most religiously adored, when my respective devotees (as is their usual custom) conform themselves to my practice, transcribe my pattern, and so live the copy of me their original. And truly this pious devotion is not so much in use among christians as is much to be wished it were: for how many zealous votaries are there that pay so profound respect to the Virgin Mary, as to place lighted tapers even at noon day upon her altars? And yet how few of them copy after her untouched chastity, her modesty, and her other commendable virtues, in the imitation whereof consists the truest esteem of divine worship?

> Farther, why should I desire a temple, since the whole world is but one ample continued choir, entirely dedicated to my use and service? Nor do I want worshippers at any place where the earth wants not inhabitants. And as to the manner of my worship, I am not yet so irrecoverably foolish, as to be prayed to by proxy, and to have my honour intermediately bestowed upon senseless images and pictures, which quite subvert the true end of religion; while the unwary supplicants seldom distinguish betwixt the things themselves and the objects they represent. The same respect in the meanwhile is paid to me in a more legitimate manner; for to me there are as many statues erected as there are moving fabrics of mortality; every person, even against his own will, carrying the image of me, *i.e.* the signal of Folly instamped on his countenance. I have not therefore the least tempting inducement to envy the more seeming state and splendour of the other gods, who are worshipped at set times and places . . while my worship extending as far as my influence, the whole world is my one altar, whereon the most valuable incense and sacrifice is perpetually offered up.

Nevertheless, in another colloquy, *The Godly Feast*, Erasmus concludes his account of the admirable lifestyle of a wealthy Christian with an approving description of the household's wall paintings and picture gallery which provide pictorial representations of the life of Christ and the apostles, to act as a daily stimulus to prayer and meditation. The more general focus of that colloquy is upon the abstention and moderation appropriate to a Christian man of wealth, and is mainly a barbed contribution to the long-running debate over the wealth of the church.

Erasmus's objections to images might thus be seen as primarily in the tradition of Saint Bernard and Saint Francis, or even of the early Luther: that images can be a distraction from appropriate devotion, and that the reverence paid to images and relics has too often resulted in a proliferation of ostentatious wealth, in the form of jewel-encrusted reliquaries and expensive donations to shrines. Erasmus's position was a variation upon arguments about the poverty of the church or the appropriateness of receiving donations in exchange for spiritual services. Such traditional and moderate objections were essentially pragmatic.

But it is also clear from Erasmus's account that his reaction was at least in part shaped by an almost visceral response to the, for him, disgustingly physical aspects of the relics proffered to him: the arm with 'still the bloody flesh adhering to it', the cloth with 'the perspiration from his face or his neck, the runnings from his nose, or such other superfluities from which the human frame is not free.' This attitude of physical revulsion was deeply entwined with other theological positions and problems concerning the human body itself. But Erasmus's main emphasis was how even those older and more simple-minded forms of devotion might be seen as 'putting to

shame the extravagance of these times', as 'reproaching us for our indulgence and our luxuries'.

Thomas More

Meanwhile, Erasmus's close friend and ally, Sir Thomas More, later to be martyred (whose decapitated head is preserved in Saint Dunstan's Church, Canterbury, because of local family connections), had written a vindication of religious images against William Tyndale, who had translated not only parts of the Bible but also Erasmus's own *Enchiridion,* or *Militant Christian.* In his lengthy treatise *A Discourse against Heresies* More offered many of the traditional arguments in favour of images, including references to the alleged Veronica, or image made without hands, the face of Christ imprinted upon a cloth used to wipe his face, and to the legend of Saint Luke painting a portrait of the Virgin Mary.

However, in a passage added to the second edition and directed against a pamphlet entitled *The Image of Love* More offers a more complex argument based upon the relationship between the reverence paid by reformers to the text of Scripture and that traditionally offered to images of Christ. Essentially, his position is that words too are only another form of image:

> I wolde also fayne wytte [know] whyther these heretyques wyll be contente that the blessyd name, of Iesus be had in honoure and reverence or not. If not then nede we no more to shewe what wretches they be whiche dare dyspyse that holy name that ye devyll trembleth to here of. And on the other syde yf they agre that the name of Iesus is to be reuerenced and had in honoure then syth that name of Iesus is nothyng els but a worde whiche by wrytyng or by voyce representeth vnto the herer the person of our sauyour Chryst, fayne wolde I wytte of these heretyques yf they gyue honour to ye name of our lorde whiche name is but an ymage representynge his person to mannes mynde and ymagynacyon, why and with what reason can they dyspyse a fygure of hym carved or paynted whiche representeth hym and his actes farre more playne and more expressely. . . .
>
> For as I somwhat sayd vnto you before, all the wordes that be eyther wrytten or spoken be but ymages representyng the thynges that ye wryter or speker conceyueth in his mynde: Lykewyse as the fygure of the thynge framed with ymagynacyon and so conceyued in the mynde is but an ymage representyng the very thyng it selfe that a man thynketh on. As for ensample, yf I tell you a tale of my good frende your mayster the ymagynacyon yt [that] I haue of hym in my mynde is not your mayster hym selfe but an ymage that representeth hym. And when I name you hym his name is neyther hym selfe nor yet ye fygure of hym whiche fygure is in myn ymagynacyon but onely an ymage

representynge to you the ymagynacyon of my mynde. Nowe yf I be too farre from you to tell it you then is the wrytyng not the name it selfe but an ymage representyng ye name. And yet all these names spoken and all these wordes wrytten be no naturall sygnes or ymages but onely made by consent and agrement of men to betoken and sygnyfye suche thynge, where as ymages paynted grauen or carued may be so well wrought and so nere to the quycke and to ye trouth that they shall naturally and moche more effectually represent the thynge than shall the name, eyther spoken or wrytten. For he that neuer herde the name of your mayster shall yf ever he sawe hym be brought in a ryght full remembraunce of hym by his ymage well wrought and touched to the quycke.

More's position is indebted to the Aristotelian or Thomist tradition, with its notion of 'sensible species', that since all knowledge is derived from sense-experience what we receive through the eye is basically comparable to that which is registered by the ear, since both forms of input, whether images or words, have to be processed by the active mind in order to yield any form of knowledge. More uses the argument about images to undermine the very notion of *scriptura sola*, of the biblical text as self-explanatory or self-validating.

It is mildly ironic that though the pamphlet *An Image Of Love* is thus castigated for its suspicion of images, the title-page of the publication itself incorporated a representation of the Trinity, with a figure of Christ filling most of the main woodcut panel, in the top corners of which are represented a bearded man as the Father and a dove as the Holy Ghost – even though both St John of Damascus and Aquinas had accepted that the Trinity itself was *infigurabilis*, not able to be given figural representation.

By contrast with More's position, Erasmus himself in his *Enchiridion* had provided a basically Neoplatonic rationale for a theology and piety which emphasised the 'spiritual'. His counter to the traditional argument that Christ's bodily incarnation justifies representational religious paintings had been that, while Christ is indeed the image of the invisible divine, it is the Gospel word which is the most adequate image of Christ himself: that the biblical text is the true divine image, that Christ is primarily the Word. Thus, More's argument effectively undercuts the positions of both Tyndall and Erasmus, while also anticipating some of the arguments of the 1640s.

Erasmus was among the first to apply humanistic textual scholarship to the Bible itself, in his 1516 revised Greek edition and new Latin translation of the New Testament. Though he also advocated an allegorical mode of biblical interpretation, favouring an Alexandrine or Origenist 'spiritual' approach over a 'literal' reading of the biblical text, Erasmus would not have regarded the issue of religious images as to be decided by any fundamentalist or uncritical appeal to alleged biblical authority. He would certainly not have been impressed by a mere list of biblical references. Yet

in his fore-grounding of the word, the text, and thus in effect the 'spiritual' over the manifestly physical aspect of the cult of relics which he disdained, there was a profound ambivalence in Erasmus's own attitude, with implications for the fundamentals of Christian doctrine and in particular for the doctrine of the incarnation. Arguably, the fuller implications of this ambivalence also became apparent only in the later iconoclastic phases of the long reformation.

against images

One later version of the official 'Anglican' position on images was summarised by the virulently anti-Catholic Bishop of Lincoln, Thomas Barlow, in a brief prepared for a lawsuit in 1683 and entitled *Popery: or, The principles and positions approved by the Church of Rome:*

> The Church of England absolutely condemns all Images of the Trinity, or any Person in it, (Father, Son, or Holy Ghost) as absolutely unlawful, and expressly condemned in Scripture. Such Images are not to be tolerated neither in nor out of Churches.
> *[Note: See the third part of the Homily against the Peril of Idolatry, in the second Book of Homilies, pag. 40.]*
> *[Note: Deut. 4. 12, 15, 16, 23. Isa. 40. 18. Rom. 1. 23, 25.]*

And:

> No Images of our Blessed Saviour, of any Saints and Martyrs, (which with stupid Superstition and Idolatry have been, and still are worshipped in the Popish Church) are, in the Judgment of our Church, to be tolerated in our Temples, or any Place of God's publick Worship.
> *[Note: See the last named Homily, Book 2. p. 42.]*

Clearly, the purpose of such official declarations against images, expounded at length in the compulsory *Homilies* to be delivered from every parish pulpit, was to protect the core theological doctrines from what was perceived as the dangers of superstitious or idolatrous practices. Yet the underlying threat to the Christian belief system may actually have been implicit within those iconophobic positions themselves.

What was at stake in the argument over images was a fundamental problem concerning the nature of the Incarnation. If God had indeed become fully human was the visual depiction of Christ a legitimate representation of the incarnate divine and the invisible divinity was no longer utterly unimaginable. Moreover, the very fact of Christ's material body arguably provided an endorsement of the legitimacy of matter itself, as against those tendencies which – in Neo-Platonic or Gnostic modes –

denigrated or repudiated the corporeal in favour of an essentially 'spiritual' notion of both the divine and the human.

light

Within the pre-Reformation theological debate about the incarnation, a common motif had directly concerned stained-glass. That light itself had a symbolic and theological significance was taken for granted throughout the mediaeval period. The divine words of creation, "Let there be light", were regarded as echoed in the prologue to St John's Gospel, 'And the light shone in the darkness', as the Word became both Light and Truth, marking a new creation. That Christ was the new light could be given an almost literalist interpretation.

One strand in patristic and mediaeval argument was the notion that the unobstructed passage of light through a glass window without physically shattering it suggested a way of grasping, or imagining, how Christ could be conceived without diminishing the virginity of Mary. A prominent feature of mediaeval representations of the Annunciation was often a shaft of light directed upon the receptive mother-to-be of God. We know that this large window in the north-west transept at Canterbury was partly devoted to several depictions of the Blessed Virgin, but Culmer's destruction of the images prevents us from knowing whether this particular motif was depicted.

The motif can be found variously formulated in sermons attributed to Saint Augustine, in a dialogue written by a disciple of Anselm, in hymns by Adam of Saint Victor and by Alexander Neckam, in handbooks for preachers, and in Advent readings in the Sarum liturgy. A standard formulation was often mis-attributed to Saint Bernard:

> Just as the brilliance of the sun fills and penetrates a glass window without damaging it, and pierces its solid form with imperceptible subtlety, neither hurting when entering nor destroying when emerging; thus the word of God, the splendor of the Father, entered the virgin chamber and then came forth from the closed womb.

The image was still viable for Herrick in his *Noble Numbers* of 1647:

> As sunbeams pierce the glass, and streaming in,
> No crack or schism leave i' th' subtle skin:
> So the divine hand worked, and brake no thread,
> But, in a mother, kept a maidenhead.

The incarnational effect of light entering through a window is frequently found in later paintings of the Annunciation, sometimes with the light directed from an aperture into the ear of the virgin, since it is the divine

Word which is being made flesh, as in Rogier van der Weyden's Saint Columba altarpiece. The motif may simply be echoed in the light suffusing the entire scene, as in Hans Memling's *The Annunciation*, and perhaps is still implicitly present in those half-open windows in later paintings, such as Vermeer's, which have no immediately apparent relation to the Annunciation itself.

More generally, the traditional pictorial sign of any saint was a halo of light, indicating their participation in divine grace, an outward sign of inner sanctity. It is clear from the very specific damage done to the windows in the cathedral that any face surrounded by a halo was the target of iconoclasts. That haloes, almost like small glass roundels, were usually depicted as semi-transparent evoked the ontologically ambiguous status of light itself, as both non-materially pervasive yet palpably part of the physical world, almost as God's own continuing presence within the creation. The theological significance of visible light was thus rich and flexible, but to assimilate the actual pregnancy of the blessed Virgin to the incursion of a light-beam was rather desperately to sidestep the awkward problem of accounting for Christ's sudden physical presence within her womb. It also highlighted the persistent issues the church had with actual sexuality and its deep suspicion of the flesh, above all that of the female body.

disputes

Even such indirect and symbolic modes of representation were unacceptable to those who completely repudiated the notion that any representation of Christ was permissible. One articulation of that position was offered by John Vicars in his *The Sinfulness and Unlawfulness of Having or Making the Picture Of Christ's Humanity*, published in 1641, just a few years before Culmer's own pamphlet. The elements of his argument are not untypical,

> I have taken upon me to prove the simple and mere making and having of the picture of our saviour Christ, even for civil or moral uses, to be utterly unlawful and so absolutely sinful. . .
>
> First, I conceive it is a sin against the text and direct word of God inhibiting any carnal, or fleshly consideration, much more a picturing of the Lord Jesus Christ the second person of the Trinity by any visible expressions and carnal valuations. . .
>
> How much more unfit is it (then) for us to make pictures, and carnal visible representations of him, he being (now) only to be seen and considered after a spiritual manner, and according to those most sweet and holy spiritual excellencies, graces, and privileges which are derived unto us from him by faith in his merits.

The logic seems to be that, even if Christ did once have a physical appearance which could be depicted, his current status, after his resurrection and ascension, would be traduced by any such portrait derived from his earthly existence. However, there is also, as partly with Erasmus, an element of sheer distaste at the physical actuality of Christ's body, and blood, during his life:

> We Christians be so profane, imperious, and irreligious, so to undervalue and vilipend our most true and holy God, our ever blessed Lord and saviour Christ Jesus, as to paint, picture, and engrave him, as a little babe, a despicable man, an enthralled malefactor, a crucified creature, only because he was graciously and voluntarily pleased thus to exhibit himself to the world, for a season, and that merely for the most admirable, and expressible and infinitely merciful working out of our redemption from everlasting horror, and for the purchasing for us of an everlasting inheritance of glory in heaven, and for none other end?

He quotes Gurnay's *Towards the Vindication of the Second Commandment* (1639) :

> Not only the most precious sufferings of our saviour are profaned, and infinitely vilified by pictures and such kind of vulgar and common expressions but also his Majesty and Person is most plainly belied and blasphemed by the means, namely in this, that his Person is exposed to the view of the world, as hanging actually dead upon a cross, and double gibbet, whereas he now actually is, and ever shall be sitting at the right hand of God in the state of eternal glory.

Since, moreover, no image can be vouched for as accurately representing Christ during his lifetime, Vicars argues:

> The image of God (and who dares deny Christ to be God?) is a lie, and the devil was a liar, and the father of lies, wherefore the lying images or pictures that are made of God or Christ (in the flesh) to his intimate dishonour come from the devil.

The objections eventually appeal directly to theological considerations:

> We are bound on our salvation to believe Christ to be perfect God, and perfect man, not mere man (as pictures and visible representations can only render him) and so God and man, as that this hypostatical union may by no means be separated without a curse.

> If thou canst not picture the Godhead of Christ, (which no man is able to do without blasphemy) dost thou not leave out his best part, and so

> most accursed and blasphemous to separate those things which God hath inseparably joined together? . . and so intimately dishonour the person of the Lord.

The most basic objection is that the godhead of Christ cannot be visible and therefore to represent only his physical body is to misrepresent that godhead. Vicars recognises that, on his own account of the composition of the human person, the same might be claimed of any man's true identity, his soul:

> Now though in a mere man, the soul may be separated (in pictures and figures) from the body without prejudice, and the bodily part be a true representation of the mere man, yet in Christ it may not be so; first (I say) because he is not a mere man although a perfect man; secondly, because the hypostatical union may not, cannot (without high dishonour to his person) be separated. For if thou wilt picture Christ in a mere bodily shape, (as otherwise thou canst not) dost thou not make him a mere man? And what difference is there then, twixt Christ and the malefactor or thief on the cross, pictured by him? Since both have but a bodily shape, and a picture can express no more of itself, then is obvious to the eye of the beholder.

In these convoluted arguments around the imaging of Christ a more fundamental issue can be registered: the implicit un-acceptability of Christ being fully human at all.

In support of his position, Vicar quotes extensively from a respected and widely cited text, Gurnay's *Vindication* but in using Gurnay's argument to make a link to the danger of idolatrous images he almost suggests that Christ's very humanity makes him too possibly only a form of diabolical false god:

> There is no kind of false god that doth more strongly resist the entertainment of the true God then these image-gods: which may well be another special cause of the true God's indignation against them. For the true God being altogether invisible, and taking up his mansion only in the heart, and these image-gods being nothing but visible, and having no abidance but in the outward eye, it must needs be, but such as have once been taken up with them, will very hardly be brought to brook and put confidence in the invisible God. And though at length they be brought to acknowledge that the true God is altogether invisible, yet will it be a hard matter for them to put up a prayer unto that invisible God, but these old wonted images will obstruct and infect the same.

In this emphasis upon the absolute invisibility of God, including the non-XX visible godhead of Christ, the most far-reaching argument within the

iconoclastic position was not simply that material images, such as statues or paintings, icons or relics, were a distraction from a truly spiritual worship but that they in fact propagated a fundamental misconception of the core object of religious belief, God himself. The underlying theological issue was the implications of the Incarnation for what is entailed to believe in God at all and, specifically, what it meant for any traditional doctrine of the Trinity.

George Salteren

The full implications of this position are legible in another 1641 work, by George Salteren, entitled *A Treatise against Images and Pictures in Churches*, in which he appeals not only to the biblical text but to patristic tradition. Part of his case against representation is again simply pragmatic, that we have no authentic portrait:

> Make thou no image of those things, whose form and countenance, God and our Saviour Christ would have to be altogether hidden, unknown, and forgotten; as Moses' body, the countenance of Christ, of his apostles, of the prophets, of the martyrs and Saints; of whom no true image can be made, because it is unknown of what form or countenance any of them were. And therefore as soon as any image is made of them, straightaway a lie is made, sayth our church in her homilies.

But he then quotes Augustine:

> It is not lawful that a Christian should be held in businesses of the eye, but in contemplation of the mind.

The significance of that last phrase becomes more apparent when Salteren glosses Tertullian's exegesis on the second commandment:

> God hath forbidden by his law that a likeness should be made . . and yet he addeth *similitudinem* or likeness, a word much more large, as that which runneth throughout all the four species of quality, and extendeth as well to the invisible conceits and imaginations of our mind, as to the exterior visible forms and figures, for what is there, either in the world, or out of the world, in act or in conceit, but it may be called *simile* or *dissimile*, like, or unlike?

The radical consequences of this argument are almost explicit when he then quotes a passage from Lactantius which can also be found in the Elizabethan *Homilies*:

> God is to be sought in the highest region; wherefore there is no doubt, but that no religion is in that place, wheresoever any image is.

Salteren is effectively suggesting that true religion is *only* to be found in 'the contemplation of the mind' and moreover in a mind cleansed of all image-based representation, while nevertheless also recognising that all modes of thought would seem to require some form of imaging, albeit a mental act of imagination. Salteren's argument is what the theologian Bernard Lonergan once termed a 'contra-position': a position which necessarily undercuts itself. It is, in effect, a self-cancelling variation upon Thomas More's argument that even a word is an image and that it is therefore impossible to maintain a conception of the divine without some form of recourse to images, either verbal or visual. The only alternative is that we contemplate a kind of apophatic or perhaps mystical emptiness. Unlike More's position, the logic of this radical version of the iconoclastic argument is to undermine the very possibility of any notion of God.

It is therefore possible to recognise that at a certain level the response of the iconoclasts in destroying images even of Christ himself indicates an underlying assimilation of those images to the diabolical: 'pictures that are made of God or Christ (in the flesh) to his intimate dishonour come from the devil.' The image of an Egyptian idol in one stained-glass window at Canterbury is clearly that of a devil, complete with horns, tail, and cloven hoof. For whatever reason, Culmer did not destroy this image but in tearing down the statue of Jesus above the Christ Church Gate he was in effect indicating that Christ too might even be a devil.

doctrines in danger

What is at issue in relation to any attempted statements about the Trinity is precisely the coherence of the claim that God is both three-fold and single, that Father, Son, and Holy Spirit are equally divine, and yet distinct, *personae*, while the Godhead nevertheless remains undividedly unique. It is at the core of Judaeo-Christian and perhaps even Islamic iconoclasm that all other alleged or apparent gods are only idols, false images, since there is but One true and invisible God.

Yet the specifically Christian doctrine of the incarnation makes that assertion sufficiently problematic that various heresies, regarded as systematically false formulations in the eyes of defensive orthodoxy, have proliferated over the centuries, repeatedly engendering accusations of multiple and various divergences from a dominant dogmatic formulation which nevertheless itself arguably defies fully intelligible articulation, despite the intricate treatises of Augustine or Aquinas on the Trinity.

In one sense, the traditional use of different images of the persons of the Trinity could serve to deflect such intellectually explicit conundra: each 'person' could have their own visual depiction and each could be endowed

with divine attributes while not being offered as representing the whole divinity. Any coherent or consistent denial of the legitimacy of images of God the Father, however, might endanger the concept of the equality of persons within the Trinity, or alternatively treat God the Father as effectively the supreme or superior God. An attack upon images could encourage the denial rather than the protection of the very doctrine of the Trinity.

If the philosophically unintelligible, or theologically indefinable, is also simply unimaginable, it may be that the conclusion in effect being evaded is that the Triune God is also only another Idol, itself a false notion, a false god. The basic Christian dilemma involves choosing between doctrines: either Christ is truly God incarnate, in which case some coherent sense has to be made of a Trinitarian belief (or at least of a dual God, though that option was rarely taken), or God is purely single and Christ is not truly divine (the most persistent divergence).

Traditionally, visual images and even verbal formulations of both the Trinity and its individual *personae* could be regarded not as directly representing these intractable theological realities but as deliberately indicating their own inadequacy by gesturing beyond themselves as images or formulas to the ultimately inexpressible theological truths they inadequately stand in place of. But to repudiate all imaginative, even if paradoxical, representation – to reject even the image of an abstract triangle as representing the Trinity – is to remove that buffering level of admitted opacity and thereby more directly to endanger the very notion of the Trinitarian 'God' itself. It may then become simply less feasible to deny that the reason the Trinity eludes intelligibility and even imaginability is because there is no God at all.

The bare notions of post-Reformation Deism were to develop as a slow adjustment to that reluctant recognition. In somewhat the way that a 'realistic' representation of 'Adam' might be acknowledged as neither true nor false but only as an imagined gloss upon a purely theoretical notion of a 'first ancestor' or 'missing link', while any insistence upon or equally any direct denial of its representational legitimacy would undermine any lingering utility of the very term 'Adam' itself.

If not only any representational image but any verbal articulation or even 'mental conception' of the divine is recognised as finally inadequate, then what may emerge is a version of apophatic or negative theology which effectively conflates the imaginable, the unimaginable, the conceivable and the inconceivable. This goes beyond both the notion that since the divinity is inconceivable it can *a fortiori* not be imagined, and also any claim that since the divinity is inconceivable it can *only* be imagined.

Such a stance as Salteren's eventually invited the possibility that the divine is neither conceivable nor imaginable because it simply doesn't exist: that there is nothing to conceive or imagine. Or, finally, that any imaging of God is wholly imaginary, and that, like any attempted representation of

Adam, while it can be neither true nor false it may, perhaps, be simply a 'work of art'. As such, perhaps 'God' may not be conceivable but can nevertheless act as some form of focus for a contemplative activity content with neither intelligibility nor imaginability - a position later emergent in some forms of modern art.

In 1653, in a letter addressed to Cromwell and the Parliament, an otherwise unknown Samuel Hering proposed, as the first of thirty reforming suggestions, a novel solution to the problem of images in churches:

> That the Sabbath should be kept holy, with religious fasting, no meate to be dressed, or eaten, but upon necessity, and that the stone churches should have no outward adornements, but the walls to be coloured black, to put men in minde of that blacknese and darknesse that is within them, and to draw them into humility.

Hering perhaps came close to drawing the full implications of the problem of conceiving the divinity:

> Sinking downe into humillity in self annihilation, I was led by the noble minde into the true nothing, in which the vanity of all thinges did appeare unto me, which caused such exulting joy and ravishment of spirit, that I earnestly wished for the dissolution of my outward body, which hindered the enjoyment and reall possession of soe pleasant and glorious a habitation, (but its limit not being at its period) I must bee content to wander in this vale of miserie till my appointed tyme.

Hering left quite unclear what 'the true nothing' might be. The logic of iconoclasm had led to atheism, or perhaps 'art'.

He might have recognised the partial fulfilment of his suggestion in the eventual construction of Mark Rothko's Chapel, that multi-million-dollar shrine for a particular strand in modern American painting, with its large almost-black rectangular canvases effectively constituting the walls that surround a more or less empty space.

There is a curious line to be traced to Rothko from the thousands of pounds once allegedly offered, according to Culmer, to save the glass of Canterbury Cathedral. But that offer was not being made to save a fabulously expensive 'work of art'.

eucharist & home

Trying to comprehend philosophical and theological conundra concerning the Trinity and the Incarnation was of course not directly at the centre of everyday mediaeval belief and devotion. However, a third doctrine which was crucially important to the dispute over images did more consciously

impinge upon and shape actual religious practice among ordinary believers. Perhaps the most severe potential fissure in customary devotional practices, as well as in the doctrinal system of the late mediaeval western theological consensus, concerned the nature of the Eucharist, and in particular the precise import and meaning of the words "This is my body".

In the late eleventh century a leading proponent and defender of the (allegedly) traditional position was Lanfranc, in his treatise *De corpore et sanguine Domini adversus Berengarium* written around 1062 when he was Abbot of Bec, and in a revised later version after 1079 when he was Archbishop of Canterbury. Lanfranc's tract was directed at the stance (allegedly) taken by a theologian named Berengarius, which disputed the meaning of the doctrinal affirmations of the Council of Rome in 1059 and reaffirmed in 1079. Berengarius's position was condemned, as proposing that the bread and wine consecrated in the Eucharist were only *figurae* or *similitudines*, images and likenesses, or symbolic memorials, but not the corporeal reality of Christ's body and blood.

Lanfranc primarily constructs his treatise upon quotations from Augustine and Ambrose and from several church councils, including the profession of faith imposed upon Berengarius in 1059:

> I profess with mouth and heart . . that the bread and wine that are placed on the altar are, after the consecration, not only the sacrament but the true body and blood of our Lord Jesus Christ, and that they are in truth sensibly and not only sacramentally touched by the hands of the priests and are broken and chewed by the teeth of the faithful . (chapter 2)

In chapter 18 Lanfranc summarises the orthodox position:

> We believe therefore that the earthly substances which on the table of the Lord are divinely sanctified by the priestly ministry are ineffably, incomprehensibly, miraculously converted by the workings of heavenly power into the essence of the Lord's body. The species and whatever other certain qualities of the earthly substances themselves, however, are preserved so that those who see it may not be horrified at the sight of flesh and blood, and believers may have a greater reward for their faith at the sight. It is, nonetheless, the body of the Lord himself existing in heaven at the right side of the Father, immortal, inviolate, whole, uncontaminated, and unharmed. Truly it is possible to say, therefore, that it is the same body that was assumed from the virgin, and also not the same body, which we receive. Indeed it is the same body as far as it concerns it essence, true nature, and its own excellence. It is not the same body in its appearance, however, if one is considering the species of bread and wine and the rest of the qualities mentioned above.

It is, thankfully, unnecessary to pursue here a dispute which was to extend over several centuries. It is worth noting that it was a one-time pupil of Lanfranc at Bec, Guitmund, later Archbishop of Aversa, in his own *De corpore et sanguine Christi,* who in effect introduced the Aristotelian distinction between 'substance' and 'accidents' to try to 'explain' the Eucharist, terms which would become central to the later highly contentious notion of 'transubstantiation'.

Lanfranc's own position can be best summed up in his brief paraphrase of Ambrose in chapter 9:

> Those things, [bread and wine] which once were, still exist according to the visible species yet are changed into the nature of those things that were not before, that is, according to the interior essence.

Here, the term *species* is not the zoological or botanical category but a common mediaeval philosophical term for that which affects a sense, in this case that which impacts upon sight: the *visible species* is what causes an appearance of something in or upon the eye. The bread and wine still look as (and, it can be added, taste as, smell as) bread and wine do – they don't simply look *like* bread and wine – yet what they essentially or really are is the body and blood of Christ.

Obviously, what is involved in this doctrine had implications for pictorial representation, as well as for the conceptualisation of the Eucharist. At the core of John Vicars' objections was, after all, a variant on the notion of 'visible species': that even the actual appearance of the living Christ cannot communicate the non-visibility of Christ's Godhead.

If, however, in the Eucharist what we can see is bread and wine but after consecration these objects are 'really' the body and blood of Christ, though we continue to see bread and wine, then painters as well as preachers had a problem. Some solutions became traditional, from depicting the host as surrounded by a halo of light to the more theatrical depiction of, for example, the Christ child emerging from the broken wafer, or blood oozing from the host. The various 'recognition' scenes in the New Testament were sometimes depicted visually with implicit reference to the Eucharistic transformation: the supper at Emmaus, the presentation in the Temple, the Transfiguration.

real presence

This particular problem of representation is not, however, my main concern here. Both pictorial and theological treatments of the Eucharist have tended to highlight the 'moment' of consecration or transformation, focussing on the immediate effect of the utterance of the specific words of consecration, and precisely how, when, or whether any such transformation occurs.

Though later doctrinal differences have notoriously concentrated upon the intricacies of philosophical formulation, what is surprisingly often overlooked in the ongoing debate and accounts is that, for the pre-Reformation ordinary believer, the 'real presence' of Christ 'in' the bread and wine was not solely, or even perhaps primarily, a matter of a particular moment of mysterious power or instant magic during the celebration of Mass, but rather a continuing 'real presence' within the church building, and indeed at times within (literally) the believing communicant: nothing, after all, could be more physical than eating, and Lanfranc's first dispute with Berengarius concerned whether it was correct to say that the body of Christ was bitten and chewed.

Yet even more crucially for popular devotional belief was the fact that *between* celebrations of Mass the consecrated host was preserved upon the altar, or in various other ways, so as to make visible the continuing real presence of Christ in the church building.

One reason for that retention of a consecrated host was that the priest of a parish was obliged, by Canon Law, to be available at any time, day or night, to administer the sacrament of Extreme Unction – the last rites – to anyone in immediate danger of death. That involved offering Communion and therefore always having a consecrated host to be taken to the sick or dying parishioner. But this also meant that the 'body of Christ' was always 'really present' in the church, a belief which had profound implications for ordinary everyday devotion and for basic attitudes to religion and indeed to 'the church'.

There were variations in practice and some awkward problems: the wine was not so preserved, since it could quickly turn into vinegar, while it was stipulated that after eight days or so any reserved host should be consumed before mould irretrievably set in. As can be imagined, elaborations and distinctions, anxiously paranoid and sometimes surreally absurd, were rife: if a consecrated host was dropped upon a rug, the fabric was to be promptly burned and disposed of through a special disposal method used for clearing up after a Eucharistic celebration. But what if a dog or rat ate the host and ran away with it, or a communicant vomited up the host? Such complex issues were best left to the professionals, and to the least squeamish curate.

For ordinary believers, the continuing Real Presence in the church building was probably more devotionally central than the taking of Communion itself. Actually consuming the host (let alone the wine) might be a relatively rare occasion for most parishioners, but seeing the consecrated host and being able to register its presence whenever they visited their local church was a crucial comfort, regular reassurance, and familiar affirmation.

Whether, after Mass, the now transformed host was locked into a small tabernacle upon the altar, kept in a side alcove, displayed in a monstrance, or – as was a common English parochial practice – suspended visibly above the altar in a small pyx, it was customary always to have a light, a candle or

lamp, burning to indicate and affirm that ongoing real presence of Christ. The lamp was often located on or near the Rood screen which separated the sanctuary from the rest of the building and thereby marked the division between the priest's domain and that of the parishioners, a matter partly of who was responsible for the maintenance of different parts of the building.

The Archdeacon of Canterbury during the brief reign of the Catholic Queen Mary, Nicholas Harpsfield (Foxe's foe), made a series of official 'Visitations' in 1556-7, travelling round the nearly 250 parishes in Kent. The main purpose of his Visitation was to ensure the restoration of the church furnishings which had been destroyed or removed during the Henrican and Edwardian regimes, and Harpsfield's detailed record provides almost a mirror image of Dowsing's record of destruction nearly a century later, in the second wave of English iconoclasm.

Over a hundred of the parish churches Harpsfield visited no longer had a sanctuary lamp to indicate the preservation of the consecrated host and in such cases this was the first item Harpsfield ordered to be reinstated. Christ was home again. To a very variable extent under post-Reformation English practice, the 'eternal fire' or sanctuary light was to be reintroduced in some 'high church' parishes, though now with a perhaps more ambiguous significance: that 'God' was somehow more particularly present in the church. But the specific implication that the local church was always occupied, that Christ was truly resident, was really present, was no longer, as it were, part of the fabric of the post-Reformation parish church.

monkish practices

It is worth emphasising that even within a monastic community such as Christ Church not all the brethren would have communicated frequently. Yet what was central to a monastery's liturgical offices was not just that Mass was celebrated daily, or indeed more than once each day, but that the consecrated host was always present and therefore in it, and as it, the real presence of Christ himself was always available in the church. In the case of the monastic cathedral both the day and night liturgical offices were therefore spent in the very presence of that real presence, which an individual monk might also choose to visit at other times for personal prayer.

As well as his theological treatises on the Eucharist, Lanfranc was also responsible in his *Monastic Constitutions* for the detailed reformulation of the rules governing the daily life of the Canterbury monastic community and other English Benedictine establishments. Crucial to that round of liturgical activities was the attention paid to the consecrated bread.

In particular, the reserved host was paraded in procession not only through the church but on certain annual occasions was taken outside the precincts of the monastery and into the streets of the city. The detailed procedures for the Palm Sunday procession, for example, focus on the

feretrum, the portable tabernacle or small shrine for the consecrated host, and the elaborate ceremonial, the hymns and ritual genuflections, all highlighted the awesome presence of Christ himself:

> When the cantor begins the antiphon 'The multitudes meet' two priests vested in albs are to come forward, who are to carry the shrine [*feretrum*], which a little before daybreak ought to have been placed there by the same priests, in which the body of Christ ought to have been laid. Those who carry the banners and the crosses and the other things which have been mentioned above are to move forward at once to the shrine; and, while those who carry the shrine stand still, they are to stand on the right and on the left of the shrine in the order in which they have come. . . At the end of the antiphon 'The multitudes meet' the boys and those who are with them are to begin the antiphon 'Hosanna to the Son of David,' genuflecting both at the beginning and at the end of the antiphon, because 'Hosanna' is said in both places. The choir is to repeat this antiphon, and in like manner to genuflect. Then the boys are to sing the antiphon 'With the angels', genuflecting only at the end of the antiphon. This antiphon is to be repeated by the monks, and in like manner a prostration is to be made. When this has been done, the abbot or the cantor is to begin the antiphon 'Hail our King', and the bearers of the shrine are to pass through the midst of the station, while those who carry the banners and the other things mentioned before go in front, all keeping in returning the order which they had in coming. As the bearers of the shrine pass by, all are to genuflect, not all at once but one by one on this side and on that as the shrine passes before them. . . Before the entering of the gates the shrine is to be placed on a table covered with a pall in such a way that the aforesaid bearers, standing on each side, may have their faces turned towards the shrine in their midst.

Such elaborate ceremonial surrounding the reserved host was at least as memorable and impressive as the actual celebration of Mass and perhaps even more emotionally significant for monastic participants and local onlookers alike. On a less elaborate scale each parish would have had similar processions and even the taking of the host to a sick person was marked by a visible ritual.

house of God

Just as the emphasis upon the Eucharistic moment of concentration may be somewhat misleading as an index to everyday devotional sensibility, so – to put it succinctly – some modern commentary upon mediaeval religious art has been susceptible to an important category mistake, or at least to arguing from a partly misleading premise. It is often assumed that the main purpose of the 'art' which so characterised the 'visible species' (to use that term in an

extended sense) of the overall appearance of a mediaeval church was primarily intended to represent *to us* the saints, miracles, and other imaged elements.

It is worth emphasising that, instead or at least in addition, the church building was above all the 'house of God', *domus dei*, and that, thanks to the doctrine of the Eucharistic real presence, it was Christ himself who was regarded as physically present, in his own home, indeed in all such local 'houses of God', precisely and visibly as the consecrated and preserved host. The primary purpose of the visual appearance of a church was to adorn and decorate this local house of Christ, and it was very largely the responsibility of the parishioners rather than the priest to provide the visible embellishments of the church while observing any canonical requirements laid down for what was needed.

The church building was the house of God but more specifically the house of Christ really present in his dwelling place, and any extensively painted walls, stained-glass windows, hanging tapestries, ornamental jewels, magnificent altar-pieces and rich altar-cloths, were primarily appropriate ornaments for Christ's local presence. The genealogical figures in the Cathedral choir and sanctuary were his very own family tree and – to put it flippantly – God already knows what his ancestors really looked like, even if we can only do our imaginative best to portray them. The numerous Saints assembled, both in their tombs and in their depictions in glass and paint, were a fitting entourage in devoted attendance as his close friends, dedicated courtiers, and domestic servants. The glittering jewels and rich textiles were to beautify his home and his table and to provide him with a suitable setting for his dwelling. Above all perhaps, his graceful mother was invariably to be seen, as visible statue or prominent painting, devotedly at home with him.

This is not to say that Christ's earthly followers and guests were not also to be instructed and encouraged to devotion by such visual embellishments of his sacred space, still less to maintain that the risen Christ, or the Father, or the Spirit, were regarded as somehow confined to these holy edifices. The whole of nature is God's dwelling place, and it was therefore also appropriate to depict that wonderfully teeming and delightful nature within his house, while for the community of believers he is most especially present in the always visible and sometimes palpable form of all, as the host upon the altar and as indeed, in a different but popularly conflated sense, as our gracious host in his very own house.

It is also important to emphasise that the local church was a shared space, that for the parishioners who were partly responsible for its maintenance and decoration, the church was a communal building. Indeed for the monastic community it was part of their own actual home. What could then go awry was the temptation to regard any artistic works, or wealth of ornament, as being for the benefit of 'the church', or the clergy, or the monastery itself as an institution, rather than as dedicated to the glory and

enjoyment of the Christ-God. Or to be so distracted by the allurements around one as to forget to whose service they, and you, were supposed to be devoted. Saint Bernard and humanist Erasmus alike were very clear about the danger of such distractions and, in effect, the misappropriation of God's own wealth.

Windows depicting Becket's miracles or illustrating the typological resonances of Old and New Testaments in the 'biblia pauperum' windows were indeed also directed at us, to depict God's goodness, and as an instructive reminder and display of his gifts to us, even if the windows themselves were also our own gifts to God's house, but the first requirement of the ancient temple itself was, after all to provide some practical windows for the house he was present in for our sake.

From this viewpoint, what was most crucial about the iconoclasm of the long Reformation was not the demolition of shrines or the defacing of tombs, the destruction of visual 'art', or its replacement by austere text, but the abolition of 'tabernacles' and above all the extinguishing of the sanctuary lamp which had indicated the continuing 'real presence', real in its own impossibly mysterious but devoutly believed and deeply affective way, of Christ-God as residing in his own dwelling. Arguably, the core long-term difference the Reformation made to popular sensibility was that God's house was no longer inhabited by the real presence of Christ himself. We can still register the almost palpable contrast between a continental Catholic church with its discreetly flickering but visible sanctuary lamp and the sense of a certain emptiness inside most English parish churches when no actual service is occurring. Christ is no longer at home in the old way.

Of course, a sanctuary lamp is, or was, a sign only to those who recognise its significance. But we might, as a partial parallel, compare a visit to a stately home where a sense of the ongoing residence of the owners can almost be felt, and those equally stately houses now embalmed in the impersonal hands of English Heritage as tourist attractions. The difference is between visiting the National Gallery, or even the John Soane Museum, and dropping in for tea with Jim Ede when he still lived in Kettle's Yard in Cambridge and kept open house every afternoon. Add to this the change in status of tombs and of prayers at them for the dead. A visit to the parish church to talk to Christ on the altar or to a dead relation waiting patiently under their tombstone was no longer what it had once been.

visible species

To return to the cathedral: what the 'dissolution of the monasteries' in the first phase of the English Reformation effected was the expulsion from their own home of those permanent residents, the monks. A few were allowed to continue with some form of stipend, or even to live as resident clergy in the drastically modified ex-monastic buildings within the cathedral precincts, but they were arguably 'no longer at home' in the old sense. What

was actually appropriated in the 'dissolution' was primarily a complex of domestic buildings and possessions, the actual living quarters of a collective body and their communal properties. The cathedral, after all, had been *their* church, even more than any parish church partly owned or looked after by its parishioners. And though the wealth and ornamentation of the cathedral may have been dedicated to beautifying God's home, the abode of Christ's real presence, the monks too had occupied, and enjoyed those devotional spaces for much of their lives, as their predecessors had for centuries.

In one sense, the cathedral building remained the *domus dei*, but in another the entire precincts were now state property, or the King's, or perhaps the current Archbishop's, or legally belonged to the Dean and Chapter. Whatever the new official niceties, what was left was no longer the same kind of communal lived-in property and shared domestic space of those who had previously lived there. The canons of the new dispensation were, after all, soon only required to be 'resident' for forty days in the year.

There are interesting long-term issues lurking here. We know that King Henry VIII, for example, had himself a substantial personal collection of pictures as well as such art-works as tapestries, jewels, and lavishly expensive clothing. Becket too, had his own trove of rich vestments, valuable gems, illuminated manuscripts, and so on. As such, these were as much private property as the estates of any wealthy landowner and no doubt most abbots or priors had personal possessions even though monastic property as such was communally owned. But now whose were the treasures removed or otherwise expropriated? What of a parish church's art-work (if we call it that), which had now been destroyed or appropriated? Harpsfield's Visitation records show that the cost of what was to be a short-lived refurbishing fell largely upon the parish communities, whether accompanied by relief and short-lived celebration for the restoration of the old ways, as some have argued, or in glum acquiescence at the unwelcome and unnecessary imposed expense.

After the abrupt end of the Marian restoration, and over the next century, so much was destroyed or removed yet again. Those many thousands of rood screens, statues, altar cloths, vestments, wall paintings, and so on which were destroyed during a long century of spoliation and iconoclasm had once been a collective possession. Now the parish churches – all sixteen thousand of them – no longer provided the old form of communal 'visible species'. It is worth asking might have been the longer-term consequences for what we now think of as 'art'. It is difficult even to formulate the question without an element of anachronism in the very use of the term 'art'. We can think of this devastation as a colossal national loss, a profound rupture in what we might now think of as the artistic or cultural continuity of Britain, but we can also emphasise the impact at the local and parochial level upon ordinary parishioners.

For most ordinary people in England their only contact with an 'artistic' (in some sense) 'visible species' – in the extended sense of the overall look

of the building – had been in their local parish church, and sometimes, on whatever ritual occasion might bring them, in the local cathedral. Or, as with the Palm Sunday procession, when some of that visible splendour came out to them in the city streets. The Corpus Christi dramas were also part of that intermittent provision of a kind of visual pleasure and even splendour, but they too were to be erased from the calendar, even if travelling players might provide some occasional substitute – though they were also to succumb to a later official hostility.

Once the local church had been effectively denuded of its visual impact for the vast majority of people it was now unthinkable that they should collectively and locally commission what we might call a pictorial art-work, let alone have the financial possibility of personally owning or individually commissioning any such form of rich ornament, or substantial decoration, remotely on a par with the previous communal 'visible species' of the local church, some of which work had once been the relatively affordable product of local craftsmen. Even a carved gravestone would be beyond the reach of most.

The many thousands of objects destroyed by Dowsing, Culmer, and their like had once been a kind of common and publicly visible possession. An almost bare building was in many cases all that now remained. We should not over-estimate the overall 'visual anorexia' memorably so labelled by Patrick Collinson, since Dowsing's own journal reminds us of how much had nevertheless survived up to that point, and there was to be a steady growth in personal and to some extent civic artwork, but this hardly compensated for or replaced the once pervasive visual culture of the local parish church accessible to every member of the community.

Though many might eventually have some access to, say, the printed images in the parish lectern Bible or in Foxe's *Acts & Monuments*, or perhaps even in their own family Bible, there was no longer the once-vivid environment of the parish service, the rood screen with its coloured figures and carved crucifix, the statues of saints on side altars, the altar cloths, the burning lights. And most of the population would certainly have no family portraits, let alone wall paintings or stained glass windows, in their individual homes. That 'visual anorexia' was to remain largely the case for decades if not centuries to come. It is worth letting the point sink in. The overall social, cultural, and political message – leaving aside any explicitly iconoclastic ideology one might or might not concur with – was that such 'art' was no longer for the likes of 'us', the majority of the population. And that message has arguably left very deep traces. Let us look again at our battered window.

glass light

It might well be claimed that for many of us today our concerns are no longer theological, but in a broad sense cultural or even 'aesthetic', and that we admiringly wander the cathedral not to clarify theological aporias but to

enjoy the art and architecture. Indeed, I suspect a common initial response to the now plain glass in the huge side windows of the nave is to regard their abundant light primarily as enabling us to appreciate more clearly the soaring pillars and the wonderful tracery of the vaulted roof. We may not even register that those very columns and arches would once have been highly decorated and coloured. Only the still painted roof bosses, high up in the intersections of the roofing, might alert us that the cathedral was once not only stone and glass but pervasive colour as well. We might notice, and even strain to peer at, the indecipherable coloured figures high up in the clerestory windows, yet we may not even ask whether the main side windows were always clear glass. It is only when we come to the blank spaces in this Royal window in the north-west transept, and in the clearly damaged 'miracle' windows in the south choir ambulatory, that our conscious response is likely to be half-formulated regret. We might begin to think vaguely in terms of mindless vandalism, or explicitly acknowledge a kind of appalled amazement at this deliberate destruction by whoever was responsible.

The visible damage might sharply remind us of the most obvious and yet at the same time astonishing achievement of these windows: that such enormous areas are largely made of fragile glass, though each glass panel is necessarily held in place by a metal and stone armature. We might even consider it amazing that so much stained glass seems to have survived – until we consult the detailed accounts of how much has actually been restored and how many thousands of broken fragments were once recorded. Since most of the Royal Window is now plain glass the contrast with the remaining stained glass can be literally highlighted: the day's light can now stream through the blank panes almost as if the glass were not there, while the impact of the images still embedded in the window clearly derives almost entirely from the modifications of the light as it passes through the variously coloured glass. In a sense, those remaining images are painted by light itself.

The plain if murky glass allows us to glimpse the sky and its shifting clouds, its different hues of grey and blue, its gradual lightening as day dawns and its darkening towards dusk. We might even recall Saint Anselm's phrase about painting on clouds. We may also consciously remind ourselves that, unlike passing visitors, the pre-Reformation monks would have responded every day to the ever-changing momentary effects of light through the scores of stained glass windows which were then still in the cathedral. Especially those illuminating the choir area, as they sang the several liturgical offices or 'hours' at different times in both day-light and night-time, often moonlit, and through changing seasons and weather, the annual ritual permutations of feast and commemoration, meditation and celebration. The stained-glass windows were however only one of the more vivid elements of what was once an all-pervasive visual experience. Yet, we might eventually also realise, there is now just one remaining spot in the

entire cathedral where only stained-glass windows are visible within one's sight-lines.

I have occasionally been in the cathedral early enough to experience a late winter dawn slowly transforming the deep shadows of its many different spaces, and on one memorable occasion, thanks to Dean Victor de Waal, I was able to wander the inside of the cathedral at midnight and to be taken with delighted surprise as Victor switched on the powerful exterior lights which are sometimes used to illuminate the facade of the cathedral at night. I recall the almost moonlit effect of the coloured light of the remaining stained glass windows being cast in the midnight darkness upon the pillars and walls of the cavernous nave and the intricately constructed choir. That must once have been a common experience for the monks chanting the night's liturgy during a full moon. Though I can barely imagine the effect of flickering candles sometimes lighting up the windows themselves.

Even on a normal dull English day, you can still become aware of the play of coloured light upon the stone pillars and flagged floor. It is easy to be reminded of the light-effects of a rainbow or a jewel, and perhaps to recall the 13th-century Franciscan Roger Bacon systematically experimenting with theories of how rainbows can be formed, through a prism or a spray of water. He argued that all attempts at a material explanation of the natural rainbow must be subordinated to the recognition that the purpose of a rainbow was to display God's continuing promise never again to send a great Flood. We might also find ourselves thinking more reflectively about why the mediaeval period so valued jewels, the iridescent effect of light refracted by precious stone, and the use of glittering gems as symbolic ornament for shrines and reliquaries: they were there not simply to manifest wealth but to embody and anticipate celestial light itself. We might even try to imagine all this movement of light accompanying the majestic annual cycle of liturgical music.

Yet the most salient feature of a window is that its glass can be so readily shattered. Some of the Elizabethan edicts permitting the destruction of superstitious images at least recognised that glass windows are also functional and that the cost of necessary replacements should be borne in mind by would-be ardent iconoclasts. Our own reaction to this broken window and to the other repaired windows within the cathedral now has a different aspect.

We tend to take for granted the functional element, since we are more familiar with glass windows than was normal in the mediaeval or even the Tudor period. So it is only on a bitterly cold day that we can appreciate why one monastic Prior was long remembered with affectionate gratitude for being the first to insert protective glass panes into the open arches of the exposed cloisters. We might also register how extra-ordinarily innovative it once was to construct the entire building as in effect a stone skeleton to support the enormous infusion of light, almost making its entire walls

transparent. We can perhaps recognise a distant precursor of those great glass sheets which comprise the walls of today's office skyscrapers.

But confronted with this damaged transept window our main reaction is very likely focused upon the loss of a "work of art", since that is how we have come to regard these artefacts, as primarily aesthetic objects. Even if, in the case of stained glass or mediaeval art in general, we might quietly acknowledge that we don't really 'understand' that art in the first place. We may even actively dislike mediaeval art-works, or merely respond in a rather unfocussed fashion (almost literally) to the overall pattern of colours. Yet the fact remains that we now arrive in our daily thousands to see precisely what Richard Culmer and his ilk deliberately destroyed: the stained glass windows of Canterbury Cathedral.

If, however, we claim that our reaction today is not theological but aesthetic we may also admit to being not very clear as to what kind of 'aesthetic' reaction might be appropriate. We might even extend this ambivalent or vaguely puzzled response to the whole cathedral. In trying to treat our visit as primarily a cultural experience, we might remain rather oddly uncertain as to quite what we mean by that very notion. Is the cathedral, itself, 'a work of art'?

a taste of art

A full depiction of the entangled relations between religious belief and aesthetics, iconoclasm and the very notion of a 'work of art', would require a large canvas. I will offer only a few fragments, some broken window panes, shards held together by the skeleton of an argument, a sketchy framework for considering aspects of this window and our possible reactions to it. Composed partly as a collage of quotations, this segment provides just a few glimpses into that problematic.

As we have seen, some Reformed tendencies regarded all images as objectionable and, at one extreme, were suspicious of any form of ornament or decoration within an ecclesiastical ritual or setting. Jonathan Swift in *A Tale Of A Tub* (§xi) has a sharply satiric portrait of a particularly ardent iconophobe:

> He was a person that feared no colours, but mortally hated all, and upon that account bore a cruel aversion to painters; insomuch, that in his paroxysms, as he walked the streets, he would have his pockets loaden with stones to pelt at the [shop]signs.

However, at least in the more moderate authorised *Homilies*, it was the religious use of images that was condemned while images in general might be condoned. The distinction was primarily a matter of where such images were displayed. If located inside a church, then by definition an image was functioning as an encouragement to superstitious practices, whereas the

display of a painting, of a biblical event or even of the Virgin Mary, might be acceptable in a private house – provided such images were not prominent in the household chapel.

This very distinction of place and function tended to foster the category of 'work of art'. By being removed from the physical context of ritual practice and devotion, and reassigned to a domestic gallery alongside the family portraits, even paintings with undeniably religious content and reference could be re-categorised as 'art', while still perhaps retaining something of the sacred aura which had marked them in their previous religious setting. There remained a characteristic English suspicion: while the importation of works from the Protestant Low Countries was probably harmless, any work stemming from Catholic Italy might be warily regarded as a potential carrier of Papal pollution or Jesuit infiltration. It was then important that such tainted paintings should not be looked upon, quite literally, as the religiously significant works they had once been.

When the considerable collection of Charles I, which included many such works, was sold off after his execution in 1649, it was not simply to raise urgent cash to pay for the Navy, but also reflected a considerable degree of hostility concerning the Roman Catholic character of his Italian Renaissance paintings and especially the Counter-Reformation or Baroque works in the Royal collection. However, after the restoration of Charles II nearly a thousand of the 1,300 works dispersed by the interregnum sale were determinedly re-appropriated by the Royal household, and by the early 1700s court-imitating aristocrats had imported some fifty thousand continental paintings in what was emerging as a highly active English art market. That market soon appropriated an influential French import: the word '*Connoisseur*' was given English circulation in Jonathan Richardson's *An Essay on the Whole Art of Criticism as it Relates to Painting and an Argument in Behalf of the Science of a Connoisseur* (1719).

Suspicious English attitudes to religious art did not entirely evaporate, as a few examples can indicate. In 1714 *The case concerning setting up images or painting of them in churches written by the learned Dr Thomas Barlow, late Bishop of Lincoln, upon his suffering such Images to be defaced in his Diocess . . published upon occasion of a painting set up in Whitechapel Church* reprinted as a topical polemical intervention the lengthy legal case against church images which had been argued by the fiercely anti-Catholic Bishop of Lincoln, Thomas Barlow, in a contentious legal case some thirty years earlier, in 1683. The pamphlet quoted extensively from the legislation against images stretching from Edward VI's reign to the interregnum. Nevertheless, Bishop Barlow had lost the earlier case, and the contested Whitechapel painting survived.

In 1725 an indignant *Letter from a parishioner of Saint Clement Danes, to the Right Rev Father in God Edmund Lord Bishop of London occasioned by his Lordship causing the picture over the altar to be taken down, with some observations on the use and abuse of church paintings in general and that picture in particular* commended the

Bishop for removing the objectionable altarpiece but still emphatically protested against 'that ridiculous, superstitious piece of popish Foppery' partly on the specific grounds that the heavenly Virgin Mary portrayed in the altarpiece was actually the 'resemblance of a Person who is the wife of his [Our Gracious Sovereign's] utter enemy, and Pensioner to the Whore of Babylon' – in other words, it was a recognisable portrait of the Pretender's Catholic consort. But going beyond this particular argument, the irate writer several times indicated that in his emphatic view no painting at all was much to be preferred in a church:

> I hope I offend not your Lordship, when I say, IF ANY PICTURE CAN BE PROPER, but such are my words and such is my opinion.

His own position is clearly indicated by his title-page epigraph, from *Exodus* chapter 32, verse 20:

> And he took the Calf which they had made, and burnt it in the Fire, and ground it to Powder, and strewed it upon the Water, and made the Children of Israel drink of it.

In 1723 the more moderate Robert Samber published *Roma Illustrata*, a guide to the most important art works in Rome. His prefatory comment is particularly worth noting:

> I have purposely omitted the description of the picture of the Trinity, in the church of the Trinity of the Pilgrims, painted by Guido Reni, and one of the finest pieces in Rome, because I would give no offence to Protestant ears. Though the Roman Catholics make no scruple to paint the Trinity, as God the Father like a venerable old man, who holds extended between his hands Jesus Christ on the cross, with the Holy Ghost like a Dove above his head, hovering in bright glory, yet with the Reformed, it is looked upon as little less than a species of idolatry: I have for that reason omitted it, because I would offend nobody.

Despite this disclaimer, Samber's preface would almost certainly have caused offence to some. He rather lightheartedly recounts a discussion with a Catholic priest in Rome concerning the representation of the Trinity. Challenged to justify the depiction of God the Father as an old man, the priest readily replies:

> Turn to the first chapter of *Ezekiel*, and the seventh of *Daniel*, and you will find that God appeared in the form of a venerable old man to these two prophets, and is called by the last of them the Ancient of Days. Besides, these kinds of paintings are mere symbols, and hieroglyphical

> mysteries, and demand our utmost veneration and respect; and this has nothing in it of idolatry.

Pressed further as to the actions of the Catholic congregation in kneeling before such images, the Catholic priest responds:

> You must know that the people here commit no manner of idolatry in bowing down to these images, for you must distinguish between the external act, and the internal. I grant you, as to outward appearance, it is the same adoration as is paid to God, but the mind pays another kind of respect or worship. And I hope your good folks in England will make a vast deal of difference in worships, though expressed by the same term. For in your service book a man says, he worships his wife, and yet I hope he is no idolater.

On the whole, it is the Catholic priest who gets the better of the argument and our English author retires from the fray, declining even to meet Cardinals Bellarmine and Baronius when offered the chance to continue the dispute. So, to recall the target of Thomas More's argument, whereas the Trinitarian image on the cover of *An Image of Love* somewhat undermined the argument of its own text, here the textual account effectively subverts the deliberate omission of the Trinitarian image.

Some of the objections against religious images were not concerned with misrepresentations of the deity but with infidelity to 'truth' and appealed to a patently simple-minded premise, barely worth polemical refutation, as in Charles Lamotte's naïve argument in his *An essay upon poetry and painting, with relation to the sacred and profane history. With an appendix concerning obscenity in writing and painting* , published in 1730:

> Truth is what limners have not been scrupulous to observe, but have taken larger freedom, and gone greater lengths than the poets themselves; and that in pieces designed for churches where it might have been expected, they should have shown more decorum, and observed a greater regard and conformity to truth. Thus one shall often see Saint Jerome attending our Saviour at the institution of the Last Supper, and Saint Francis present at the crucifixion, though both lived many hundred years after him. And this has not only been done by common daubers and country painters, but by some of the most eminent of the profession, as the famous Paul Veronese in one of his finest pieces, the *Changing Water into Wine at the Marriage of Cana*, which is to be seen in the convent of St George at Venice. In this piece by an unpardonable licence and a ridiculous compliment, he has placed among the other guests some Benedictine monks for whose convent he

> wrought that piece; an Order that was not known till above five hundred years after the working of this miracle. . . .
>
> How shall I know Saint James the Apostle with a bourdon or pilgrim's staff, and set out with shells and trinkets as going on a pilgrimage, when I am very sure there were no pilgrims in his days; and yet he is drawn in this ridiculous equipage, because, forsooth, there is daily a great resort of pilgrims to his pretended shrine? Whether this be a just reason for thus disguising the Saint, I will leave you, sir, to judge

With considerable more common sense, in 1761 a substantial volume entitled *The Ornaments of Churches Considered with a particular view to the Late Decoration of the Parish Church of Saint Margaret Westminster*, by William Hole was published during a furore over an attempt to install a stained-glass window above the altar in the Parliamentary church itself. The treatise was tactfully composed as a sober and restrained historical survey, presenting itself as wholly detached from any unseemly polemical *parti-pris* – while nevertheless evincing, in a suitably scholarly manner, the undoubted 'Propriety and Lawfulness' of the disputed window. The title page has a perhaps slyly pointed epigraph:

> … Love the high embowed Roof,
> With antic Pillars, massy Proof,
> And storyed Windows richly dight,
> Casting a dim religious Light

– taken from Milton's *Il Pensoroso*, since the poet's defence of regicide was by now safely subsumed under his literary eminence. That Milton could be regarded in this harmless way was indicative of a wider shift, towards a notion of 'art' and 'literature' which effectively set aside, for example, the suspect theological stance and implicit political radicalism of *Paradise Lost*, treating it merely as a commendable literary work of art.

By the end of the century Velantine Green, as part of his argument in favour of public support for the visual arts, and especially for English practitioners, could lament, in his *A review of the polite arts in France, at the time of their establishment under Louis the XIVth, compared with their present state in England:* (1782) that :

> Saint Pauls Cathedral has been deprived of a noble benefaction of Paintings, to which the Royal Academy had proposed to present it, for the embellishment of the wide waste of its solitary inside, agreeable to the original design of Sir Christopher Wren. . . The idea that the admission of Pictures into our Churches, would be alarming weak minds with the fear of a restoration of Popery amongst us, is to shut up the most honourable avenue the Arts could have wished open, through

> which to have engaged the Public attention to the importance of their being properly applied.

Green can barely conceal his sarcastic disdain for what he sees as an irrational rejection of religious imagery:

> With regard to the real grounds of the fears suggested, I do not feel it hazarding too bold an expression in saying, that a Heresy in our principles of faith altogether, might be more reasonably expected to take place, than that from the remove we have made from the foot of the Cross as an Object of our Adoration, we should be again found prostrating ourselves before Stocks, Stones, or Pictures as mediums through which we should be persuaded to offer up our devotions to Heaven.

He offers an *argumentum ad absurdum*:

> If the Scriptural Subjects in Painting, be unfit for our Churches, they are less suitable to our domestic habitations, and ought therefore to be wholly suppressed: for it is incompatible with our reverence of the duties they inculcate, that we should suffer their examples to be pourtrayed for the decoration of our houses, if they are capable of such dangerous violences to our faith, and modes of worship, as are ascribed to them, when found in our Churches, in the proportion of the evil complained of in public, being so much multiplied in their being found in almost every house we enter.

Green thus almost sardonically reverses the emphasis of the *Homilies* by insisting that religious paintings are surely even more dangerous within a domestic context.

However, by directly reversing the position that religious art is harmless as domestic decoration, Green almost implies that it is the image itself not its use which is relevant and therefore that such works can appropriately be located in churches precisely as works of art and not as having any profound religious function to perform. He also offers the related but withering observation that while representations of Christian history in Christian churches are decried, the tombs which litter those same churches are replete with representations of figures from classical pagan mythology to celebrate the achievements and virtues of their illustrious Christian inhabitants. His particular ire is reserved for the news that the Royal Chapel at Windsor would not commission English painters to decorate its walls, but that instead:

> It was now proposed to embellish that Church with *Copies of some of the celebrated Italian Pictures, and to send commissions to Rome for that purpose!*

Clearly, overt resistance to Italian religious art had somewhat dissipated. Yet still the issues inherited from iconoclasm had transmuted rather than entirely disappeared.

iconoclasm of attention

The debates concerning the visual (and other) arts were ostensibly concerned with quite different matters than theological issues. The 18th-century English conversation about 'art' had been initially shaped by various tendencies imported from France. An appeal to formal Beauty as the decisive criterion of artistic worth was most succinctly exemplified by Roger De Piles' mode of assessing his preferred pantheon of great artists by awarding them marks out of twenty under the headings: Composition, Drawing, Colour, and Expression – conveniently tabulated in a comparative balance sheet appended to his *The Principles of Painting,* 1753 edition, pp. 295-300, entitled:

> The Balance Of Painters: a catalogue of the names of the most noted painters, and their degrees of perfection, in the four principal parts of painting ; supposing absolute perfection to be divided into twenty degrees or parts.

This effectively discounted any concern with the chosen subject matter or 'content' of a painting, though in the 1706 English edition of De Piles' *The art of painting, and the lives of the painters* the anxious translator still inserted occasional anti-Catholic asides, warning good Protestant readers of possible offence even at mere discussions of painted representations of the Trinity, as for example:

> The reader will easily perceive it is a Papist that argues thus for the Idolatrous Custom of representing the Holy Trinity, and the Angels and humane Figures; the argument is so mean it deserves no Answer, and the Poison so weak, it needs no Antidote, or we might quote against him, the 7th Verse of the 97th Psalm, the same he has quoted above where are these words: Confounded be all they that serve graven Images, that boast themselves of Idols; Worship him all ye Gods. (p.44)

The formalist tendency in De Piles might be called an '*iconoclasm of attention*', by which I mean a mode of regarding even blatantly religious paintings in a way which effectively removed from discussion or even explicit recognition any specific religious significance – almost as if a stained-glass window had been whitewashed or wiped clean yet somehow left intact, with its colours still glowing but no longer illuminating any devotional or dogmatic content, by an erasure or eradication of, or indeed

an abstraction from, any religious substance while retaining an appreciation of the play of light and colour, technique and composition.

What this mode of response chose to see was 'art' rather than theological affirmation, decorative images rather than devotional reverence, aesthetic form rather than doctrinal message. In a word, Beauty rather than Belief: Titian's colour palette rather than the composition of the Trinity. It was a short step from such an underlying attitude to some of the actual windows now in the Canterbury Cathedral Corona, assembled from colourful fragments of ancient glass to form a pleasing effect which defeats any attempt to 'explain' the composition to inquiring tourists. The aesthetically pleasing re-arrangement of the genealogical figures as they are now in the south-west transept window, described earlier, is a further variation.

Moreover, that 'aesthetic' attitude of largely disregarding the 'subject', or what was depicted, was not concerned only with specifically religious content. In the development of a profitable art market, numerous portraits and landscapes which had once been commissioned as a contribution to the visual celebration of a particular family, household, or estate, were detached from such site-specific contexts, and evacuated of their local content and original significance, since their interest for a new purchaser could hardly be one of resonant homage towards other people's past relatives or unidentified sitters, still less any particular affection for someone else's prize racehorse now long dead. Instead, the possession of such recycled works was justified in terms of their alleged aesthetic qualities and wherever possible by their attribution to some prestigious Master of the Art of Painting. The actual content or subject of such paintings was decidedly secondary, though – like the imposing shelves of weighty second-hand law volumes adorning a start-up solicitor's office – such works might have speciously lent a vicarious status to the parvenu owners.

An opposing aesthetic position was associated with a focus more specifically upon 'Truth', to be partly located in the faithful representation of a painting's chosen 'subject', with the highest accolade being awarded according to a hierarchy of genres partly defined by the depicted content. However, the highest category, 'History Painting', not only required of the painter convincing 'historical veracity', displaying an exact and comprehensive knowledge of textual sources and material evidence, and an attention to the manners and fashions of a past period, but at the same time demanded a representation of 'Human Nature' itself, to be discerned as both transcending and embodied in the chosen anecdote or incident depicted, a quasi-incarnational motif echoing the older pictorial representation of passing incidents from the life of Christ as manifesting his divinity.

Portraiture came next, followed by Landscape, with Animal painting as an acceptable lower rank of painterly ambition. All were indeed to be judged by their fidelity to what they depicted, a *veri-similitude* to be tested against observation, yet also, in a contrary but supplementary manoeuvre, to be

assessed precisely in terms of what could not be visually represented on the canvas: those allegedly transcendental 'Truths' which could only be suggested by any actual physical paint. Here, a certain fissure appeared: what was this generalising Human Truth and could one perhaps also be awarded marks out of twenty for somehow including it, an added category for graded assessment? Yet how could there be any independent access to correct criteria, except perhaps by comparison with other painted attempts, with their Truth rankings presumably most securely manifested in the competitive valuations of the art market itself?

In the 17th-century French Court these two tendencies with their competing emphases upon Beauty and Truth had been somewhat arbitrarily allied with different attitudes towards monarchical absolutism. In a post-absolutist English context, however, one's stately home could happily display the memorable verisimilitude of one's own (or, at a pinch, someone else's, even some imported Italian nobility's) ancestral portraits or the self-satisfied representation of an attractive estate, complete with impressive horses, hounds, and breeding bull, but one could also increasingly decorate the Long Gallery with expensive trophies from one's Grand Tour, including not only souvenir city-scapes and fondly recalled picturesque landscapes, but esoteric classical allegories and suitably selected masterpieces, or at least canonically admirable examples, of Italian Renaissance religious Art. And even, let it be aesthetically acknowledged, the occasional more or less chastely erotic nude, to whom the same tactic of a selectively appreciative perception might be applied, a demure iconoclasm of attention.

The essential point, after all, was not actually how the paintings were to be appropriately assessed but the crucial fact that they had already been so assessed, largely by the French and Italian criteria of the art market – or, obviously, they wouldn't be in one's collection at all.

The potentially diverging criteria of Beauty and Truth could be at least rhetorically combined by appeal to the governing notion of 'Taste', admittedly a somewhat elusive category, somehow reconciling an affirmation of allegedly Universal Standards (of both Beauty and Truth) with an undeniable variety of actual or proclaimed personal preferences and disparate individual judgements. The *rapprochement* between such contending positions and evaluations was to be ultimately located in that gentlemanly creature 'The Man Of Taste'.

Again, a few texts must compress an extended discussion, which could stretch from at least Castiglione's *The Courtier* (newly translated in 1724) and Henry Peacham's 1622 *Compleat Gentleman*, through Shaftesbury and Burke to, at least, Matthew Arnold and Walter Pater. What can be foregrounded in this context, however, is the still lingering presence of quasi-theological considerations and some of the after-effects of the iconoclastic phases of the Long Reformation, underpinned by developments traceable to the civil war itself, which had after all been the immediate context for Richard Culmer's attack upon Canterbury's stained glass Royal Window.

It is of course almost futile to sketch here an interpretation of the English 17th-century civil war, but let me construct a crude skeletal armature. To deploy terms developed in the previous discussion of 'history', the problem is not so much deciding 'what happened?' Few periods in English history have been so intensively researched or served by quite so much contemporary documentation and surviving ephemeral publications. (Incidentally, it was that same anti-Catholic Bishop Barlow to whom the massive collection of Thomason civil war pamphlets was initially entrusted.) Nor is it simply a matter of deciding between obviously competing interpretations, as to 'which happened?'

Across recent decades, the debate has often seemed to be more about 'which *kind* of history', what fundamental form of explanation, is appropriate, and one could sometimes feel that the ideological conflicts attributed to the civil war protagonists were being re-fought, re-staged, even re-enacted, in the polemical disagreements of modern historians. Certainly, any formulation in terms of 'what *really* happened' may seem merely a variation upon theological assertions about a real presence emphatically discernible by some beneath admittedly undeniable yet misleading appearances which are incompatibily perceived as the surfaces of much more profound patterns of causality.

Nevertheless, if we initially frame the Civil War period itself by comparing English political conflicts both before and after the 17th-century clash we might suggest some salient features. We could recall again the familiar model of Shakespeare's history plays set in the Wars of the Roses, which reflect back upon a period in which political contests centred primarily upon two or more competing aristocratic groupings, or (if one prefers) baronial robber-gangs, attempting to settle the Royal succession between them, with the King most often as the leader of one self-interested band against another, and with the kingship itself as the prize of more or less armed conflict.

Then, between the reigns of Henry VII and James I, the oscillations of political power seemed shaped more by accidents of birth and sterility, with almost arbitrary fluctuations of Royal religious belief, but always within the context of overarching national-religious European conflicts, eventually resulting under the long-lived but barren Elizabeth in an attempt to maintain a more or less successfully uncommitted position within that diplomatic and military battleground, but with the effect of partly displacing traditional elite power struggles into internal religious jostling.

If however we then attend to the situation after 1660 and certainly after about 1710, the King or kingship as such has become more like a relatively minor trophy, to be passed from one competing bloc to another, but with the monarch essentially a bit-part player rather than the crucial prize. And those blocs were no longer differentiated primarily in terms of aristocratic

family networks or clan lineage but rather composited of both aristocratic and what we might by now loosely call bourgeois adherences and alliances, perhaps only briefly sharing particular local aims, objectives, interests. There is some broad correlation between ecclesiastical tendencies and economic interests in the shifting micro-politics of eighteenth-century parliamentary groupings around actual disagreements of policy, or even more about divisions of booty, but the aligned forces can be barely differentiated under such portmanteau labels as Whig and Tory.

What we might then suggest as having crucially occurred in the intervening formation of the Civil War period itself was an over-determined transition in which, from a partly residual perspective, the contending groups were still clustered on the one side around a King and on the other around a prospect of a non-monarchical Republican authority rather than merely an alternative King, while from another but emergent perspective the contest was between two composite groupings, each comprising both aristocratic and non-aristocratic ruling elements.

To some extent, Shakespeare's *King Lear* anticipates a problematic in which the King is no King, while his *Coriolanus* outlines a situation in which the nakedly military underpinning of political power becomes foregrounded, almost as a dramatic and logical anticipation of the Cromwellian moment. Neither outcome was considered to be stably viable in 1660 or 1688. Crucially, however, but only for a very brief moment, a third component had also entered the civil war equation: the forceful and self-conscious presence of those who were neither aristocrats nor gentry but ordinary, if also sometimes extra-ordinary, common soldiers, those who had figured intermittently in Shakespeare's staged combats but who actually if briefly hovered on the brink of a potential alternative form of power in 1647.

Those who had appeared in the mediaeval chronicles or military accounts only as the enumerated anonymous, as the zero figures of merely tabulated calculations of the dead, had briefly asserted themselves and made their voices heard, not least in the extraordinary *Agreement of the People*. Except that neither Court nor Cromwell agreed with them and the aborted Putney debates left only subterranean tremors, or perhaps tumours.

By deliberately excluding this third strand, what the post-war settlement could achieve was the ongoing consolidation and convergence of ruling social and economic fractions, previously more or less distinct and antagonistic, as opposed potential governing groups, aristocratic and gentry, court and country, Cavalier and Roundhead. Power struggles between such groupings did not cease, but there was also the shared tactical cultivation of an eventual consensus concerning the proper and desirable qualities of Courtier and Gentleman, Castiglione and Peacham, incorporating both country and city, landowner and merchant.

This constituted eventually the formation of a unified cultural bloc which could recognise and endorse, in addition to its overall monopoly of the

major sources of wealth, a shared set of proclaimed values and assumptions, manners and tastes, which aimed to ensure that the previous dangerously destructive conflicts were now in abeyance and that a joint hegemony could securely underpin a new combined class formation. A crucially necessary move was to prevent any resurgence of the dangerous 'other ranks', and that required a bulwark against divisions within the new combined camp of those who, unlike any remaining irreconcilable Republicans and Levellers, had now settled matters by acceptance of the modified monarchical institution to their own satisfaction and benefit.

On this highly schematic reading, and in this context, what is significant about the post-war period is that the ideological terms in which the civil war had been to a great extent explicitly articulated, both those of religious reform or reaction and those of monarchical versus republican positions, were no longer of crucial importance in a situation in which religious allegiances had clearly by now become so splintered into a variety of denominations, sects, devotional sensibilities and movements, that a supposedly national religion, a single doctrinally defined 'Church of England', could not in practice act as a primary unifying channel of post-war reconciliation. Except precisely by a peculiarly English evacuation of any definite dogmatic or theological coherence, a further version of an iconoclasm of attention.

At the same time the contest between monarchical and republican forms of state governance had been so constitutionally resolved, or de-fanged, as to initiate an ostensible mode of 'party' competition for political and economic hegemony, but operating (apart from the odd Rebellion) within the agreed boundaries of so-called Parliamentary or limited monarchy.

It was therefore imperative to evolve a form of liveable *rapprochement* and reconciliation between those restricted groupings which would allow them to contest for power in a now less disruptive and non-violent mode, but which could also serve to deflect or exclude those unwelcome other social forces which had momentarily emerged within the multi-dimensional cross-currents of the 1640s and would have to be firmly prevented from consolidating as a potential alternativer power in its own right, especially the radical trajectory of, among others, the forgotten Levellers, Diggers, and Ranters.

It is broadly in this frame that I would therefore situate the development of the discourse around 'the work of art' and 'the man of taste' in the eighteenth century, as both a partial alternative to some residual religious ideological disagreement within the newly consolidated but still internally differentiated ruling bloc, and also as a far from minor contribution to marginalising any fundamental challenge from outside that bloc. Eventually, almost as a replay of some of the latent tendencies in the long religious Reformation, the coherence of that cultural mode was itself eventually vulnerable to new forms of iconoclasm. It is time to pick up the threads again, with some further fragmentary shards or glimpses.

discourses on taste

One minor but representative contribution to the ostensibly aesthetic discussion, entitled *A Discourse Concerning Propriety of Manners, Taste and Beauty*, published in 1751, without a named author, asks and pretends to answer the fashionable question:

> But wherein doth a true or right judgement of things consist? It consists in a perception, or discernment, of the truly excellent or useful, obtained (so far as we are capable of obtaining it) by means of reason and experience. But what is the standard, or criterion, of the truly excellent or useful? It is universal happiness, or good. All things natural and moral, are excellent, useful, amiable, and beautiful; and the contrary in proportion to their relation, or repugnance, to that external standard and accordingly become the objects of a true or false taste. . . Thus the everlasting law of moral propriety, is likewise the law of the beautiful, and of true taste.

Yet how is one to arrive at such Taste or acquire the capacity for it? The argument turns even more circular and blatant:

> As the law of virtue is the law of true taste, and of the beautiful, the tastes of Horatio and Rusticus, with regard to propriety, are in proportion to their knowledge of the beautiful; and the difference of that knowledge is as their difference of power and opportunity. So that if Horatio's knowledge of the beautiful were to Rusticus's, as a thousand to one, their propriety of taste would be in the same proportion .

There is even an elegantly glancing gesture towards the actual social factors involved:

> Manner of education, natural constitution, genius, customs, habit, conversation, riches, honours, poverty, content, *et cetera* have each a particular influence informing the taste. . . An extensive knowledge of the beautiful is only acquired by a polite and virtuous education: and consequently propriety and delicacy of taste. . . It is thus that men of sublime virtue and refined taste in a multitude of instances perceive the truth as sense does the light of the sun.

This combination of lingering or submerged appeal to quasi-religious premises together with explicit social assumptions is even more apparent in *Clio or, A Discourse on Taste*, *addressed to a Young Lady,* published by James Ussher in 1767:

> I know no reason for our perception of absolute eternal beauty in the virtues I have mentioned, but by supposing that the Father of Being, who is Eternal Truth and Goodness, and the original standard of grandeur and beauty, has stamped on our minds a sense of those absolute and eternal perfections. . . True taste discovers with delight, and pursues nature with faithful passion. The Graceful and the Becoming are never found separated from Nature and Propriety. . . Good Taste, like the morning beam, paints in their different colours all the objects of our view, and informs us of whatever is beautiful and engaging. It is the inward light of universal beauty.

But is Good Taste responsible for eliciting the 'universal beauty' so revealed or is proper taste merely a reaction to that beauty? Is the alleged informing light somehow inward to the object of beauty itself or is it the inner 'grace' (note the word) located in those equipped to appreciate such beauty? Ussher's lady interlocutor raises an even trickier problem. She asks :

> If elegance be inseparable from propriety and nature, why are not the common people, who are without education, just as nature made them, the most graceful?

The proffered answer makes more blatantly apparent what was at stake in this polite discussion about 'taste':

> Their low station, their wants and employments, give them a sordidness and ungenerosity of disposition together with a coarseness and nakedness of expression, from whence it happens, that their motions and address are equally rude and ungraceful.

On the other hand:

> Observe the few in a higher station, who by their fortunes are disengaged from wretchedness and poverty, and who are at liberty to follow the bent of the human genius. You see their taste soon distinguish them from the crowd, and assume a more elevated character. They discover a thousand beauties in the creation which the vulgar know nothing of, and elegance and decency make their appearance in the human state. . .
>
> Personal elegance, for that is the object of our present enquiry, may be defined as the image and reflection of the grandeur and beauty of the invisible soul. Grandeur and beauty in the soul itself, are not objects of sense; colours cannot paint them, but they diffuse inexpressible loveliness over the person. . .

> It is also because elegance is the reflection of the soul appearing in action, that good statues and pictures drawn from life, are laid before the eye in motion. If you look at the old Gothic churches built in barbarous ages, you will see the statues reared up dead and inanimate against the walls.

Again, is this mysterious 'soul' or elusive 'grace' to be located primarily in the innards of the appreciative *connoisseur* or somehow within the statue or object itself? Or is there a pre-established harmony, indeed a social affinity, such that the Man of Taste is himself both the acknowledged (if occasionally mocked) adjudicator and also the living exemplar at the apex of an undoubted hierarchy, a product of well-brought-up gentility, combined with a proper education, sufficient economic independence to be suitably dis-interested in any mere monetary value (though coyly well-informed as to the current art market), but above all blessed with a certain – well, what shall we call it? – a *je ne sais quoi*. Perhaps indeed he himself is a work of art?

It is almost needless to add that a woman could not be a man of taste. But Ussher has some specifically gendered advice for his lady listener:

> A lady should rather appear to think well than to speak well of books; she may show the engaging light that good taste and sensibility always diffuse over conversation; she may give instances of her sense of great and affecting passages, because they display the fineness of her imagination, or the goodness of her heart; but all criticism beyond this fits as awkwardly upon her as her grandfather's large spectacles. I would by all means have a lady know more than she displays, because it gives her unaffected powers in discourse, for the same reason that a person's efforts are easy and firm, when his action requires not his full strength.
>
> She should have an acquaintance with the fine arts, because they enrich and beautify the imagination; but she should carefully keep them out of view in the shape of learning, and let them run through the easy happy vein of unpremeditated thought: for this reason she should never use nor even understand the terms of art: the gentlemen will occasionally explain them to her.

All that is required – perhaps even of some neophyte gentlemen themselves – is to learn to *appear* to behave *as though* one understood 'art'.

> I knew a lady of vast address when a term of art came to be mentioned, always turn to the gentleman she had a mind to compliment, and with uncommon grace asked him the meaning of it; by this means she gave men the air of superiority they like so well, while she held him in chains. No human can be more delicate than this, which plays upon the

tyrant, who requires an acknowledged superiority of sense as well as power, from the weaker sex.

Signor Cosmetti (a perhaps deliberately superficial pseudonym?), in his *The Polite Arts: Dedicated To The Ladies*, 1767, added this further practical advice:

> When you view a painting, take particular care not to go, like ignorant people, excessively near; but rather, beginning far off, approach gradually, till it appears rough, then recede a little, till it looks sweeter: it is what *connoisseurs* call finding the proper light of a painting.
>
> An object is best seen when the eye lies in the dark, and the object in the light: for this reason you see some connoisseurs, who make an arch with the hand over the eye, when they look at a piece of painting, as the mind perceives better when the eye is confined, and free from the surrounding atmosphere.

Such (quite sensible) advice almost suggests, however, that the function of these various tracts on 'aesthetics' and 'taste' was primarily to provide tips for how to give the impression of appreciating the works, just as the numerous easily available printed lists of artists' names, dates, and their particular master-pieces, allowed one a rapid training in apparent expertise. Nowadays we use headphones instead, to inform us how long to linger before, or ignore, a gallery's offerings.

Advice on to how to behave appropriately in the exhibition room or art gallery could take a manifestly satirical form, while usefully suggesting one crucial physical prop. An anonymous piece in 1767 provided the following *An Infallible Receipt to make an* EXHIBITION CRITIC, *copied verbatim from the original lately given to mr.* Nicodemus Bluntquill, *an Inhabitant of Grub-Street, by his Bookseller* (which I have also copied verbatim, from *Painting For Money – the visual arts and the public sphere in 18th century England* by David H Solkin, Yale, 1992, p. 250) :

> Take the Shilling you will receive by the Bearer, go to the Exhibition Room at Spring Gardens, give it in Exchange for a Catalogue and sneak into the Room, taking great Care you are not smoaked, for should you be known it will ruin the whole Process. When you have shaken off the pleasing Sensation that such a Number of ingenious Performances must necessarily give you, direct your whole Attention to the Company, particularly to such of them as you observe use Glasses or wear Spectacles; lose not a Word of what they say, for as the Wasp steals the Honey he cannot make himself, so you are to avail yourself of every Thing these Gentlemen who are titled *Connoisseurs* utter, by which Means you will Procure a large Quantity of the *Essence of Prejudice*; and observe, that of this Essence you cannot have too much. You may next

> direct your Attention to the Ladies, of whom you will easily obtain two or three Ounces of *Exhibition Salvolatile*, or Epithets such as *horrid! shocking! abominable! a perfect Dawb! &c &c*.; cork these up immediately lest they should evaporate.

In his popular 1788 print of the *Royal Academy exhibition at Somerset House 1787* Johann Heinrich Ramberg depicted precisely such a connoisseur armed with an ostentatious eye-glass peering closely at a non-descript painting, while all around him the proper work of exhibition-visiting continues: the ogling of young ladies, the fluttering of fans and flirtatious glances, the sycophantic fawning upon the Prince of Wales. Of course, almost nobody actually looks at the paintings.

We will shortly be attending to the tomb just beneath this Royal window which has prompted these considerations, that of a Franciscan Archbishop of Canterbury whose work indirectly contributed to the very invention of such eye-glasses – but let us have some more aesthetic meandering first.

Reynolds

What would those gallery attenders have seen, or thought they were seeing, anyway? After all, 'Grandeur and beauty in the soul itself, are not objects of sense; colours cannot paint them.' Perhaps the most authoritative voice of 18th-century English discourse on painting, Sir Joshua Reynolds, in his *Ninth Discourse*, delivered at the opening of the Royal Academy School in Somerset House in 1780, somewhat undermined the usefulness of a connoisseur's eye-glasses:

> The Art which we profess has beauty as its object; this it is our business to discover and to express; but the beauty of which we are in quest is general and intellectual; it is an idea that subsists only in the mind . . which [the artist] . . is so far able to communicate, as to raise the thoughts, and extend the views of the spectator; and which, by a succession of art, may be so far diffused, that its effects may extend themselves imperceptibly into publick benefits, and be among the means of bestowing on whole nations refinement of taste . . till that contemplation of universal rectitude and harmony which began by Taste, may, as it is exalted and refined, conclude in Virtue.

Even using 'her grandfather's large spectacles' a young lady might find it difficult actually to *see* 'an idea that subsists only in the mind', any more than bringing a telescope to bear upon the consecrated host would have unveiled the real body of Christ. But it was the important function of Sir Joshua to explain how a mere painting could extend its influence 'imperceptibly into publick benefits, and be among the means of bestowing on whole nations refinement of taste.'

Though there were carefully defined limits to the diffusion of such benefits. Above the entrance to the Royal Academy was the rubric 'Let None But Men Of Taste Presume To Enter Here' – written, however, in Greek. And it was decided, after some debate, to charge an entrance fee to the RA exhibitions, specifically in order to exclude 'improper persons' – 'such as livery servants, foot soldiers, porters, women with children etc.' – just in case such undesirables had not already been deterred by the Greek inscription they could not read. (See Ronald Paulson, *Hogarth*, volume III, 1993, pp. 315, 330.)

Clearly, I am suggesting that the function of appropriately (and expensively) acquired Taste was not primarily to resolve intricate questions arising in the philosophy of aesthetics but rather to help consolidate a convergence of aristocracy and gentry, through various rites which constituted one's entry qualification into a new social formation, embracing both elite family lineage (succession) and *nouveau riche* (aspiration), increasingly characterised by a shared 'education' (even if some readers of *The Spectator*, for example, still required a crib for the Latin epigraphs), an increasingly overlapping marriage-market, and most high-visibly of all, regular participation in a shared 'Art' market (including perhaps more importantly a shared Fashion Market).

After all, one could easily purchase the requisite physical object, an approved painting or sculpture to add to one's collection, even if one never quite acquired any other mark of appropriate culture. It was then socially important that the grounds for appreciating such desirable acquisitions should never be so pedantically formulated as to provoke offensive disagreements or awkward divisions between those who subscribed to the ostensibly shared aesthetic orthodoxy. There was definitely (no matter what the French did) to be no repeat of unfortunately opposed dogmatic allegiances, so long as common rituals and devotions were observed in practice, though of course a little witty bantering or point-scoring was all part of the game. Heaven forbid that a true gentleman should genuinely dispute about taste, any more than about the precise theological meaning of the Eucharist. We had seen where that led. A bland characteristically English vacuousness was much to be preferred.

This required a certain balancing act. Thus, one of the crucial technical terms of art about which a lady should certainly not inquire too closely, was the almost ubiquitous *je ne sais quoi*, another French phrase coming to the rescue, lest the *maladroit* female or lower-class oaf commit some plebeian *faux pas*. The term, as with 'good taste' and 'grace', judiciously oscillated between referring to some ineffable quality of the work itself and an indefinable characteristic of whoever properly aspires to appreciate that quality, otherwise known as 'Art'. The *je ne sais quoi* was in this aspect not wholly unlike the conundrum of the Trinity itself, since likewise its precise meaning and reference endlessly eluded rational clarification. And not entirely removed from the old dilemma of whether one was pre-destined to

salvation or damnation. It simply had to be acknowledged that some – if not by immaculate conception, at least by decidedly fortunate incarnation – had clearly been chosen to become *connoisseurs* while others would remain at best, well, 'proper persons'.

A 1726 translation of Baltasar Gracian's *The Hero* (originally published in 1637), allowed the neophyte English *connoisseur* belatedly to learn from chapter XIII, entitled 'That he should have the *je ne sais quoi* in him':

> This certain something, which the French call *le je ne sais quoi*, that is the Soul of all the other good Qualities required in an Hero, that gives Ornament to his Actions, Grace to his Words, and an unavoidable Charm to every thing that comes from him, is as far above our Thoughts as it is our Expressions; for no Man ever yet did, or ever will be able to comprehend it. 'Tis the Lustre of Brightness, which does not strike us without it; and the Agreeableness of Beauty, which does not please us without it; for it only can give the Cast and Fashion, as I may call it, to all the good Qualities that do adorn us. In a word, 'tis the Perfection of Perfection itself, and what communicates a Flavour to everything that is Good or Beautiful in us. . . .
>
> The Desire however of defining it, and the Impossibility of succeeding therein, has put Men upon inventing different Names, according to the different Impression it makes on them. 'Tis at one time, *a certain something*, so majestick and great; at another, *something* so lovely and genteel; in this case, 'tis *a certain something* so bold or so gracious; in that, *something* so lively or so soft; and every one in short gives it an Appellation, according to the different Views it represents.
>
> It is a further Property of this, that some perceive it where others do not; for it does not strike all alike, but therein differs, according to the Measure of their Knowledge or Manner of their Sensibility.

A form of vague Neo-Platonism (perhaps duly indicated in those insistent capitalisations) might thus be appealed to as somehow mysteriously uniting the claims of Truth and Beauty.

In particular, the several divergent emphases actually jostling for dominance could be partly reconciled by the recurrent motif of Light or even Enlightenment, and implicit in that very term was a sometimes explicit appeal to 'Art' as always providing some form of 'window', a pervasive image which could happily accommodate several tendencies, while also of course supporting that curious habit of perching portable glass windows upon one's nose.

windows

At its most empirically obvious, pictorial art could be seen as acting as a transparent window upon the world, allowing us to see through its aesthetic framing the true beauty of the natural world, rendered more visible by the

skill of the artist. The rectangular shape of the standard canvas was thereby transformed from an opaque fabric into a 'view', the canvas itself now a translucent medium that could transport us, like a magically portable window, to a vantage point from which to enjoy a landscape, a picturesque panorama, or turbulent seascape, visibly painted but palpably 'real'. Alternatively, one might simply purchase a Lorraine Glass.

In addition, the artwork could at the same time apparently provide a window into the elusive soul of the artist, some glimpse into the otherwise inaccessible beauty and truth which an 'inward light' allowed the insightful or inspired artist to gaze upon and to express through the medium of his (extremely rarely, her) Art. The art-work could thereby, like an opening casement, allow the more myopic souls into the most intimate recesses of another's sensibility, to share vicariously an inner world, including the precise mode in which that exceptional individual sensitivity experienced the outer world, and stamped the sea-scape or portrait with its particular perception, yet allowed us all (well, all proper persons) to see through the artist's own eyes and even feel precariously with his deep interior feelings. A quite extraordinarily useful pair of glasses to have perched upon someone else's inner nose.

The third persistent window motif was that True Art somehow permitted an opening onto a realm of transcendence, so that perhaps even the unimaginable divine could be mysteriously rendered visible by the artist, revealing creation itself in a new light, art as its own kind of both revelation and incarnation, a material instantiation or embodiment of a spiritual dimension beyond our normal perception. A window onto more than the mere heavens, if not Heaven itself. Though precisely how pigment or pastel achieved these various tricks of spiritual transubstantiation was not necessarily visible by an ever closer inspection of the brushwork. Even by using grandfather's glasses. Ceilings tended to be a favourite locale for such uplifting if sometimes out of focus visions.

It would be possible to map these variations of the window motif onto both aesthetic treatises and artistic practices throughout the eighteenth century and beyond. But the various gentlemanly muted disagreements and polite divergences between these view-points were often resolved only by a kind of acceptable vagueness. As a last resort, after all, as advised to suitably attentive young ladies, one could simply fake any required appreciation. Nevertheless, even to have access to these mysterious windows onto grace, truth and beauty one did, after all, have to have the chance actually to see, if not touch, the art works in question, if only in reproduction. And though it would be possible to explore further the divergences between the different aesthetic tendencies and opposing theoretical allegiances discernible in these rarified 18th-century English conversations, what also needs acknowledgement is what – or rather who – was left out of the debate.

One reason for the need for a new cultural consensus was that, arguably since the Henrican Reformation and certainly since the 1688 settlement, there was actually now no single all-embracing national church, whatever the claims or assertions. Religious allegiance could no longer be confidently regarded as providing an effective social bond, since there were now not only divergent tendencies within the overall church in England but officially recognised or at least tolerated religious organisations which were increasingly self-defined as comprehensive alternatives to the self-proclaimed Church of England.

Possibly the single most unifying religious factor within the overall composition of the emergent English national culture was in fact negative: an often virulent anti-Catholicism, which of course by definition excluded some proportion of those who still made up that national culture. It might be argued that as long as a single hierarchical pre-Reformation national church and, crucially, a common parochial devotional practice had prevailed, a degree of consensus at the level of relatively inarticulate belief-content had been the more or less taken for granted product of that shared practice, even if intermittently challenged by relatively marginalised theological dissent.

It was not so much that a consciously or even coherently agreed doctrinal or dogmatic system had generated a unified single church, within the context of a wider European Christendom, but rather that the entrenched overall institutional apparatus of religious ritual had sustained at least the impression of a shared doctrinal consensus, a common expression of 'the faith', even at the expense of there being no rationally intelligible account of that ostensibly affirmed belief which most parishioners might have been able to give of the doctrinal assertions to which they gave an habitual assent in practice. After all, they too could 'fake it' when necessary. A crucial part of that lived consensus had been the 'visible species' of the parish church. It was the breakdown of that taken for granted institutional practice and local setting which generated or liberated the proliferating diversity of doctrinal disagreements while the visible trans-formation of the appearance of the parish church had arguably even longer consequences.

It can be similarly suggested that it was to be, eventually, the achievement or imposition of an extensive apparatus of 'national' institutions and 'cultural' practices (sometimes optimistically displaced onto the surviving remnants of a merely iconic monarchy, as 'Royal' institutions) which generated the illusion of a coherent and shared political identity and allegiance. Within that overall process, the development of new cultural institutions played a significant role, in particular initially for the consolidation of the reconstituted ruling elite. Provided those institutions were in practice shared and maintained by that social minority it was relatively unimportant which particular aesthetic or other cultural

tendencies were currently adopted, advocated, or tolerated within it. The localised, and indeed mainly metropolitan, effect was a consolidation of those small groups within society who could exercise these privileges of 'cultural' possession and access, so that in effect a convergence of taste was also an assimilation of elites. One might trace a parallel utilisation of 'the classics' in the curriculum of public schools, or even elaborate a thesis concerning the extraordinary phenomenon of concert performances of a 'Haydn Mass' or 'Mozart Mass' for people who had never actually attended a Mass at all, but my focus here remains upon the visual sphere. Yet in significant ways those new 'cultural' institutions were clearly not an effective substitute for the previous role of the local parish church.

Since religion had signally failed to provide an over-arching ideological consensus, the resort to a form of social hegemonic identity based upon shared conventions and demands (even if vacuous) of 'taste and manners' was clearly a desirable objective among a certain social stratum. Yet one weakness of this partly unconscious strategy was precisely that whereas religion up to, and perhaps for some time after, the Henrican Reformation had at least attempted to incorporate every level of society into its unified ideological embrace, the new phase of specifically cultural formation partly sustained itself by deliberately establishing a differentiation, an exclusion of those not assimilable to the hegemonic cultural consensus, those potential levellers also known as 'improper persons'. Or, as the lady interlocutor put it, 'the common people, who are without education, just as nature made them'. Eventually, in another long revolution, these mutual reinforcements between cultural apparatus, aesthetic ideology, and political hegemony were to prove as potentially insecure as in the case of the religious institution.

However, it was not just that there was no genuinely unifying national church, or indeed that the religious conflicts which had partly underpinned the civil war were arguably still continuing in muted forms. More specifically, every urban and rural domain which had once been the territory of a local parish church was no longer populated by a unified 'believing' or at least practising community, but now visibly and consciously split into various sects and denominations with their own chapels, halls, or dissenting and covert recusant meeting places. Very occasionally even a single building was physically divided and areas within it allocated to different belief communities. This divergence of visible practice itself tended to consolidate and even generate a further diversification.

What I want to emphasise in particular is that without that local shared parish experience of a considerable degree of familiar visual ornamentation and figural representation, most of which had been obliterated by the various waves of iconoclasm, there was no longer that minimal degree of participation in a common visual culture. As detailed earlier, the refusal of the offered further enhancement of the walls of Saint Paul's or the various campaigns against painted altar-pieces illustrate the impasse. Yet it was not only that there was no longer a common artifically constructed visual

experience, but that in many such religious meeting places there was now none at all. Nor indeed anywhere else for the vast majority of the English population. Except in the streets themselves, with an emerging visual culture shaped more by commercial advertising than by religious devotion, by window-shopping and the display of chap-books and cheap posters, displacing the dulled lure of bare local church and demolished neighbourhood shrine.

Certainly, unlike an aristocratic or gentry household, it was most improbable that the homes of most of the population might have had commissioned portraits of their ancestors or pictorial celebrations of their estates, still less visual souvenirs of a grand tour, or an Italian religious painting bought at auction. For some, the lurid and vivid prints of Foxe's *Book Of Martyrs* provided some form of substitute, as discussed earlier.

Moreover, the majority were not only physically and financially debarred from access to the emerging high art apparatus. The very terms of the debate about artistic merit also tended to exclude those without direct access to the actual works. An emphasis upon composition and overall formal structure might be reconcilable with a mere black-and-white woodcut or cheap print reproduction, though only of a quality that would still remain financially out of reach for the vast majority of the population, even if they actually wanted to eavesdrop on the discourse of artistic appreciation. But it was undoubtedly difficult to appreciate Titian's colours from a woodcut.

The invention of printing had not only seen the proliferation of translated versions of the Bible text but also at least the possibility of the distribution of cheap visual prints, yet almost by definition such cheap prints were themselves excluded from the category of 'art'. And a woodcut or engraving could certainly not present the vivid colours of a Turner sunset, despite Turner's own dedication to making affordable and sometimes hand-coloured prints of his most commercially successful works. The precise verisimilitude so emphasised in, for example, John Ruskin's lovingly meticulous descriptions of both nature and landscape paintings was necessarily invisible in a small reproduction. The painterly qualities of an artist's specific brush strokes and his characteristic palette is simply not accessible to such early forms of mechanical reproduction.

It would be tempting to trace the role played by the mechanisms of reproduction in the complex story of how throughout the later eighteenth and 19th-century various attempts were made to incorporate previously 'improper persons' within the hegemonic reach of 'culture' (since the alternative was seen by some as 'anarchy') but arguably the longer-term significance of such mechanisms was not as a means to bridge the cultural gap between the visual repertoire of the high art apparatus and the vast majority excluded from it, but rather to reconstitute the whole cultural field partly in terms of a continuing gulf or abyss between several components of it.

Nevertheless, one instance of a partial challenge to the general fissure can be briefly registered. It indirectly allows us to return to the cathedral at Canterbury and eventually to a development which one might regard as almost a reversal of iconoclasm.

a Hogarth interlude

It's surely time anyway for a switch of tone, from this opinionated scepticism to the mildly comic, and to return, a little fortuitously, to Canterbury. Among the few works which arguably straddled the cultural fissure were the prints of Hogarth. The disreputable levellers had not gone away. They were omnipresent in those prints – the common people, who are without education, just as nature made them, and with all the other characteristics of improper persons.

Not everybody in the eighteenth century English aesthetic conversation was prepared to succumb to the superior obfuscations of the French. That firmly English painter William Hogarth offered his own homespun *Analysis Of Beauty* (1753) which put the 'Man of Taste' firmly in his non-place. Actual knowledge of the *je ne sais quoi* belonged properly to the artist not to the *connoisseur*, and Hogarth claimed to know precisely what the *quoi* was:

> It is no wonder that this subject should have so long been thought inexplicable, since the nature of many parts of it cannot possibly come within the reach of mere men of letters; otherwise those ingenious gentleman who have lately published treatises upon it … would not so soon have been bewildered in their accounts of it.

Hogarth claimed the privilege of knowing as a practitioner what the elusive 'Beauty' consisted of, and was prepared to demonstrate it in illustrative sketches and black and white diagrams. The treatise on 'Beauty' was part of Hogarth's several campaigns for working artists, to establish a professional organisation, to secure better exhibition facilities, and to sell more affordable prints of his own work. The enemy always lurking in the background was the Royal Academy. For Hogarth, the making of a painting was indeed a work of art, but with the emphasis on work, with the art as a working skill rather than an unknowable attribute. Nor was it necessarily a matter for solemnity and awe, erudition and spiritual endowment, as his own satirical and comic output demonstrated..

On one occasion, Hogarth cheerfully took part in a sketching trip around Kent with four companions and fellow artists. He was happy to see it mockingly recorded. A written diary account of the trip was rendered into deliberately not-quite-utterly-execrable Hudibrastic verses by a minor Canon of Canterbury Cathedral whom we have briefly met. Though not on the trip himself, William Gostling composed *The Five Days Peregrination* : *An Account of what seemed most remarkable in the five Days Peregrination . . Imitated in*

Hudibrasticks by one well acquainted with some of the Travellers, and of the Places here celebrated, with liberty of some Additions. The mock-pompous air even of the title sets the tone.

With perhaps a glance at Erasmus's *Peregrinatio* as well as Chaucer's travellers, Gostling interspersed the abominably-rhyming narrative not with pilgrims' tales but with illustrations from the five friends' sketch books. The work pokes light fun at the actual down-to-earth business of earning a living by fiddling with a pen and brush, with art presented not as a visitation of the divine or even a dose of French *espirit* but as a working holiday. For example:

> But by and by when up we got,
> Sam Scott was missing, "Where's Sam Scott?"
> "Oh ! here he comes. Well ! whence come you?"
> "Why from the Bridge taking a view
> Of something that did highly please me,
> But people passing by would teaze me—
> With 'Do you work on Sundays, friend?'
> So that I could not make an end."
> At this we laugh'd, for 'twas our will
> Like men of taste that day to kill.

The crack about working on Sundays evokes both the Sabbatarian Puritan and the waged artisan demanding his one day off, while the shaft directed at 'men of taste' is double-edged. The actual and enjoyable work of art does not however cease, and later:

> We borrow'd a great wooden chair,
> And plac'd it in the open street,
> Where, in much state, did Hogarth sit
> To draw the town house, church, and steeple,
> Surrounded by a crowd of people,
> Tag, rag, and bobtail, stood quite thick there,
> And cry'd, "What a sweet pretty picture!"

From his artistic *cathedra* and throne Hogarth receives the plaudits of the 'Tag, rag, and bobtail' who, though 'quite thick', offer artistic appreciation as judiciously in-articulate as any ostensibly sophisticated visitor to an RA exhibition.

The whole exercise is a kind of domestic parody of the Grand Tour but one actually undertaken by artists able to produce their own travelling sketches of the territory and not content simply to purchase some vicarious visual souvenir of the experience. The vogue for 'sketching holidays' and Picturesque tours was soon to be more widely democratised.

William Gostling

Hogarth's friend William Gostling takes us firmly back to Canterbury Cathedral. He was a minor Canon of the Cathedral for over fifty-five years, from 1727 to his death in 1777. During that long tenure he would appear never to have published a sermon, still less any theological or scholarly work. We know that he collected ancient coins and medals, since his collection was sold at auction after his death, as was his library though no detailed record of the books seems to survive. He also made brief contributions to the *Gentleman's Magazine* and to the *Transactions of the Royal Society*, in the form of some short communications about fireworks, and two letters concerning a meteor which had been seen in Canterbury. He had inherited and then added to a substantial and important collection of musical scores which initially derived in particular from his father's acquaintanceship with Henry Purcell, John Gostling having been famous as an extraordinary bass singer for whom Purcell composed a number of virtuoso pieces. By all accounts, William spent most of his time showing visitors around the city and cathedral, but even this pleasant activity was severely curtailed in the last years of his life by the onset of crippling gout – which may of course indicate that he had other more self-indulgent ways of spending his time. Overall, this life's record may not seem much in the way of achievement or contribution.

However, in 1774 Gostling published a book which is a classic of its kind and went into several posthumous editions, in 1777, 1779, 1796, with a 19th-century edition in 1825. It remains available today in various print-on-demand versions and is downloadable from the Internet Archive. The work has the appealing title *A Walk in and about the City of Canterbury* : *with many Observations Not hitherto described in any other Publication*. I quoted from Gostling's *Walk* at the very beginning of this extended essay and it is time to consider it in more detail.

His amiable Preface in the 1774 edition sets the tone:

> I give this little book a preface to apprize my reader, that it is not merely an abstract of others written on the same subject, (though they are often mentioned in it) but such an actual survey as the title promises, and he himself may take if he pleases; designed not only to assist strangers in their searches after what is curious here, but to make the inhabitants sensible, that many things are so, which they may have seen over and over without taking notice of them . .
>
> Not that I offer this as a faultless performance; old age and gout have been great hindrances to that. Sometimes I have not been able to hold a pen for weeks or months together; sometimes the press has been otherwise engaged, till I could hardly tell what had passed it: but my memory, I thank God, is pretty good, and some of my friends, who thought it a pity my observations should be forgotten, so soon as I am

likely to be, have not only verified them by walks taken on purpose, but by adding such curious ones of their own, as I was ill capable of making in the more active part of my life. Thus far therefore my reader is a gainer by my infirmities. . .

Wits . . may divert themselves with my title page, and laugh at my undertaking the office of a guide and companion, if they are told I have been confined to my bed and my chair for some years past; and they are heartily welcome to be as arch on me as they please; to think of the pleasure I have formerly enjoyed in that character gives me pleasure still; and (to borrow a hint from one of our best poets)

My limbs, tho' they are lame, I find
Put no fetters on my mind.

That, God be praised, is still at liberty and rejoices at the thoughts of a little ramble. A good-natured reader will indulge this fancy in an old man. On such a one I gladly wait to the utmost of my ability: let us then set out upon our imaginary walk without delay, and I hope it will prove an entertaining one.

As an arthritic eighty-year-old myself I find this a somewhat consoling passage. A portrait published in the second edition matches the impression given by the passage.

William is holding a copy of his book and the portrait rather invites us to read it.

The second edition was published after his death to raise funds for his somewhat impoverished daughter Hester, and nearly 600 subscribers are listed, making it clear that William had enjoyed a considerable respect and at

least local popularity. The advertisement to that 1777 edition adds to our sense of the author:

> The substantial proof of the regard, which his friends retained for the memory of her father, given in the very numerous subscription, calls for the warmest acknowledgements from his daughter; especially as so many have very greatly exceeded the terms of the subscription in their liberality. . .
>
> . . Her most grateful thanks are also due to those friends who have contributed to the embellishment of this little book

– by financing the thirty or so plates and illustrations.

pocket companion

Gostling's volume could have been discussed in the context of the variations upon Somner's work traced earlier and in relation to the problems of writing a 'history' of the cathedral. The overall organisation of the book is more or less that of Somner, but Gostling offers his own very different version of the architectural history of the Cathedral, which tentatively and politely disputes the by-then received account as given by Somner, Dart, Burnby, and so on. Gostling suggests, for example, that parts of the crypt might even date back to the days of King Alfred, and maintains that the evidence for Anselm replacing Lanfranc's choir is unconvincing. He also regards the standard reading of Gervase's tract on the rebuilding after the 1174 fire as mistakenly interpreted.

The detailed account he gives of the city, as he takes his reader on a meandering stroll around the main features and the back streets, still has an appeal to local inhabitants, as I discovered several years ago when producing an interactive CD-ROM called *Gostling's Ghost* to raise funds for the cathedral library. I also realised then that many of the unusual features which drew his somewhat whimsical attention are still discoverable in the present fabric of the city. Which partly indicates why the book retains a readership and why it is appropriate to discuss his work in the present context.

Consider the opening paragraph of the Introduction:

> The traveller who visits Canterbury, and is curious to see what is worthy of notice here, may be glad of a pocket companion to attend him in his walks, as well as to let him know beforehand, what entertainment such walks may afford him. If husbandry and agriculture are his taste, our extensive hop-gardens, and the management of them, may be an agreeable amusement, and a novelty too, if he come from any of the counties which have no such plantations.

We are promised 'entertainment' and 'agreeable amusement', 'novelty' and whatever is 'worthy of notice'. His use of the term 'taste' does not summon up a 'Man of Taste', and Gostling goes on to refer to 'arts and mechanisms' which might be 'more so' to his visitor's taste – since by 'arts' he is referring to 'the Canterbury worsted' which has 'for many years been in great request among knitters', and he immediately recommends that Canterbury silkweavers 'are certainly worth . . visiting . . for the beauty of their works, and the curious contrivances of the looms for making them in such perfection'. The introduction ends on a now familiar note for a tourist guidebook:

> If antiquity and architecture be his favourite studies, here he will have a more ample field to range in. They who stay only an hour or two in Canterbury, generally choose to see our venerable cathedral. It will take more time to visit the ruins of St. Augustine's monastery, and the little church of St. Martin without our walls. These, and some other particulars I shall treat of here, may help to employ those hours to his satisfaction, which he does not choose to spend at an Inn.

It is characteristic of Gostling to recognise that the 'satisfaction' of an excursion to Canterbury may have as much to do with leisurely drinking and dining as with attention to antiquity and architecture.

Gostling's use of the word 'taste' is worth pursuing, since it normally occurs in such phrases as 'other parts of the building . . are continued . . in the very same taste westward', or 'our crypts under the choir are exactly in the same taste; not that of the Normans', or 'it [a roof] seems to have been a part of the Gothic taste', and the word refers effectively to what we would now call a period 'style', indicating the difference between – in Gostling's own rather idiosyncratically defined use of the terms – 'Saxon', 'Gothic', and 'Norman'. But it is the repeated word 'curious' that most interests me.

curious

The Preface had already spoken of his desire 'to assist strangers in their searches after what is curious here' and mentioned his friends 'adding such curious ones [walks and observations] of their own', while the Introduction refers to travellers 'curious to see what is worthy of notice here' and to the 'curious contrivances' of the weavers' looms.

Some further instances can illustrate his intriguingly wide range of usage of the word, though I have not given the quotations according to their occurrence in the book but rather to reflect some of the different senses in which Gostling uses the term. It is a surprisingly long list and I have included only a sample. Given the six available editions it would be

confusing as well as largely unnecessary to give page-references, but I have italicised the term in each instance.

> If any hints I give lead the *curious* to happier conclusions than I have been able to form . . I should not think my labour lost.
>
> [re: the Black Prince's chantry] with ribs *curiously* moulded, and having carved ornaments at their intersections.
>
> [re: the Chapter House] A very *curious* observer has taken notice, 'that we see no part of the roof adorned in this manner before the buildings of Prior Chillenden's erection.'
>
> [re: the crypt] supposing it built by the same hands that erected the *curious* crypt of Grymbald at Oxford.
>
> . . discovered by digging . . mosaic and other pavements, *curious* earthen ware, and coins innumerable.
>
> a stranger may wonder at [breaches in the wall] . . to satisfy his *curiosity* I shall inform him, that . .
>
> in widening the passage over King's-bridge in 1769, somebody found out it would be good economy to demolish those *curious* arches, as the materials might perhaps save some expense in the new work.
>
> This suburb is well built, and of a good breadth; and if my stranger be *curious* enough to go to it by Wincheap gap, he will then see the full dimensions of this fine old gate.
>
> the *Philosophical Transactions*, No. 365, has produced a great many *curious* reasons to prove it was so.
>
> [re: Gervase on the location of the organ] a *curious* eye may discover a small part of the old wall on the outside, still uncased.
> Though we find them so void of ornament, they are not without a subject for our *curiosity*.
>
> A manuscript I am favoured with the use of, enables me to give some account of these vaults, which may deserve a chapter to itself. It is kept, with other *curious* papers, by the Rev. the Dean of Canterbury for the time being.
>
> The late *curious* and learned captain Armstrong thought the Celtic Druids prior to the British.

The OED acknowledges most of the nuances which are in play here, but rather than simply distinguish the various functions of the term I want to probe some possible frames for this network of uses and meanings.

In Gostling's text the word 'curious' seems at times to be characterised as having no specific meaning at all, but loosely indicates either an object or an attitude which in different ways escape categorisation, the object as somehow anomalous and the attitude as almost but not quite self-explanatory or even self-illustrative.

There is sometimes an echo of an earlier Renaissance use of the phrase 'Cabinet of Curiosities' and the owner of one such cabinet is commemorated at the foot of this window around which my comments are circling.

John Bargrave had been made a Canon of the cathedral in 1662 and had assembled what he explicitly called his 'cabinet of curiosities', which was bequeathed on his death in 1680 to the Dean and Chapter. It has since led a somewhat secluded life, being made available only occasionally for inspection in the library. The point of such a 'cabinet' was to house a collection of what might now be regarded as a purely miscellaneous assemblage of peculiar, odd, unusual, unfamiliar items, but from another viewpoint constituted an intriguing array of objects which might pose at least quasi-scientific questions as to their character, origin, or function. Bargrave's collection has been extensively discussed by an old friend, Stephen Bann, in his *Under the Sign: John Bargrave as Collector, Traveler, and Witness* (1995). There was no specific scientific niche or even discipline into which such 'curiosities' clearly fitted and it was the collector's personal and often idiosyncratic interests, or in another extended sense his 'taste', which governed and organised his selection. One might be reminded of Borges' fabled Chinese encyclopaedia.

In a partly similar way, what Gostling indicates by his constant use of the term 'curious' is sometimes rather strictly the notion that a particular object is at least an unusual example of a category or genre, as in 'curious' examples of Roman brickwork or mosaic, but at others 'curious' indicates that there is no obvious or coherent category of which the object in question is an example. For instance, Gostling took a kind of delight in pointing to a street water pump which on close inspection turns out to be made from the barrel of a cannon. But is there then a rather curious category of 'the curious'?

The OED lists one sense of 'curious' as associated with the vocabulary of connoisseurship, and this usage seems present in some of Gostling's phrases such as 'ribs curiously moulded', 'those curious arches', and 'rich and curious cases' (reliquaries), as indicating some degree of unusual skill in a construction or carving, while the term in this sense can also indicate a person of unusual skill or expertise, 'A very curious observer' or 'The late curious and learned captain', 'the curious describer of Ely Minster', though also occasionally used with a negative overtone, as with the writer who

'produced a great many curious reasons to prove' a position with which Gostling thoroughly disagrees. At times 'curiosity' seems almost a merely neutral attitude of inquiry ('To satisfy his curiosity I shall inform him'), but for the most part it has a positive and even complimentary resonance: 'if my stranger be curious enough..', or 'If any hints I give lead the curious to happier conclusions', and 'they are not without a subject for our curiosity'.

Gostling's book is, in effect, written for those who are 'curious' about 'the curious', and though these 'curiosities' might include 'a curious account from Matthew Paris' or 'other curious papers', he is clearly not appealing to a dedicated antiquarian, still less to a scholarly historian, archivist, or professional architect, though at times he implicitly reproves those lacking in sufficient curiosity: 'The casing of the walls, visible enough to a curious eye' or 'An observer of any curiosity standing at this end, will discover . . '. Clearly, some visitors or readers may be more appropriately 'curious' than others, and perhaps sufficiently sympathetic followers of Gostling's itinerary might even qualify for some lower category of connoisseur.

In effect, his repetitive but undefined use of this term 'curious' in its vaguest and widest sense acts as a characterisation of exactly the kind of visitor who might visit a city or cathedral without having any particularly articulated or specific purpose in mind – almost, in other words, a definition of a tourist.

However, Gostling's intended reader is not someone likely to have meticulously planned their visit, as some might organise an expensive and educative Grand Tour of Europe, but rather more like Hogarth and his friends embarking on a leisurely jaunt, a relaxed 'tour' of parochial and domestic Kent. Gostling's book concludes with a short additional chapter of advice on how to conduct a brief tour of Kent itself, where again an unexpected object might be accorded the undefinable accolade of 'curiosity':

> From hence to Hythe is a pleasant ride, part of it near the sea-side, with that on one hand; while on the other is a range of hills, very high and some very steep; on one of which has been an entrenchment. The greatest curiosity at Hythe is a charnel-house with a multitude of bones, of which the accounts given are but unsatisfactory.

Gostling even nostalgically evokes a particular conjunction of a visitor with impressive credentials and a suitably 'curious' local informant:

> In September, 1754, I had the pleasure of showing the great traveller Dr. Pocock, (who died Bishop of Meath, in Ireland, in 1765) the parts of our coast which I am now describing. We visited these venerable ruins with a gentleman of Sandwich, who from the old castle conducted us to some banks hard by, which he called *the mounts*, where we found very plain remains of this work, not mentioned by any Kentish writer

> that I know of, unless the little camp, as Dr. Harris calls it, page 379 of his history, to the south-west of this castle be so; containing, as he guesses, not above an acre of ground, having a mount at each corner, though the form is oval or circular, and some remains of an entrance on each side. Our stay was short, but a very curious antiquary of Sandwich has lately taken a survey of it, which I give in his own words . . .

However, let me churlishly spurn the curious allure of the Kentish country sights and return to Canterbury and the cathedral.

Art?

There are a few occasions when a more less recognisable issue of 'art' enters Gostling's discussion or description. Describing the post-1174 choir he writes:

> That new capitals were added more beautiful than the old ones, I can easily believe; and cannot help observing, that in some of these, and in many of the smaller ones, the architects seem to have had an eye to the more elegant taste of the ancient orders of the Greek and Roman buildings, as we shall see again when we come to the chapel of the Holy Trinity. At present we are in Lanfranc's building, on the top of the stairs which brought us to the south aisle of it; where on the right hand is a door and stair-case leading up to a beautiful chapel over that of St. Michael, and in the same style, being part of Archbishop Sudbury's repairs.

Here the apparent preference for 'the elegant taste of the ancient orders' does not preclude a chapel 'in the same style' as Lanfranc's 'Norman' building being 'beautiful', just as the opening comments on the nave quoted earlier make it plain that a reaction of awe and pleasure did not depend upon any assessment based upon classical criteria. On the same page there is a footnote:

> It seems pretty remarkable, that within the compass of an hundred years there should have been six priors who made architecture their study, and of whose taste and skill we have many beautiful proofs at this time; but here the monks judged perfectly right; nothing could do greater honour to the society, or so well express their zeal for the house of God, the keeping and adorning of which was entrusted to their care, as choosing those to preside over them, who were best qualified to direct them in the discharge of that trust.

Despite such enthusiastic judgements, Gostling rarely suggests any specific criteria by which to judge artistic success or otherwise, since it is sufficient to his task simply to encourage his reader, or imagined companion, to observe, take note, have their curiosity aroused. It is not that the objects pointed out are in themselves necessarily artistically impressive, conventionally beautiful, or even aesthetically pleasing, since they are selected primarily because they stimulate 'curiosity', which is not so much an attribute of the object itself as a feeling or experience of the visitor. Moreover, the reference here to 'the house of God' as indicating the overall rationale or purpose of the cathedral is also surprisingly unusual in the text, since Gostling rarely explains or glosses any noticeable feature in terms of, for example, its liturgical function.

lyrical ballads

A writer whose work was contemporary with the later editions of Gostling's *Walk* can provide a formulation for the process I am considering. I quoted much earlier Coleridge's response to a Gothic cathedral. In 1798 Coleridge and Wordsworth jointly published *Lyrical Ballads*, introduced by an 'Advertisement' with an affirmation of an attempt to create a work of art deploying the resources not only of the cultural elite but of the 'middle and lower classes':

> The majority of the following poems are to be considered as experiments. They were written chiefly with a view to ascertain how far the language of conversation in the middle and lower classes of society is adapted to the purposes of poetic pleasure.

Yet the established presuppositions are duly and immediately acknowledged:

> Readers of superior judgment may disapprove of the style in which many of these pieces are executed [and] it must be expected that many lines and phrases will not exactly suit their taste. It will perhaps appear to them, that wishing to avoid the prevalent fault of the day, the author has sometimes descended too low, and that many of his expressions are too familiar, and not of sufficient dignity.

This 1798 'Advertisement' ends by quoting Joshua Reynolds, while at the same time making simpering allowance for an alternative approach:

> An accurate taste in poetry, and in all the other arts, Sir Joshua Reynolds has observed, is an acquired talent, which can only be produced by severe thought, and a long continued intercourse with the best models of composition. This is mentioned not with so ridiculous a

> purpose as to prevent the most inexperienced reader from judging for himself; but merely to temper the rashness of decision, and to suggest that if poetry be a subject on which much time has not been bestowed, the judgment may be erroneous, and that in many cases it necessarily will be so.

By 1800 Wordsworth's position had modulated and the Preface to the two-volume second edition of the *Lyrical Ballads* proposes the famous formulation:

> It has been said that each of these poems has a purpose. Another circumstance must be mentioned which distinguishes these Poems from the popular Poetry of the day; it is this, that the feeling therein developed gives importance to the action and situation, and not the action and situation to the feeling.

The core position here has considerable ramifications. By 1807, in his new two-volume selection of his own work, the implications are apparent in some of Wordsworth's best-known poems. The point can be made at the expense of some editorial excisions. 'The Solitary Reaper' conjures up a sight and sound:

> Behold her, single in the field,
> Yon solitary Highland Lass!
> Reaping and singing by herself; . . .
> O listen! for the Vale profound
> Is overflowing with the sound.

She is presumably singing in Gaelic so the speaker asks:

> Will no one tell me what she sings? —

but his concern and response is not with the actual content of her song but rather with his own fantasised projection of the singer:

> No Nightingale did ever chaunt
> More welcome notes to weary bands
> Of travellers in some shady haunt,
> Among Arabian sands:
> A voice so thrilling ne'er was heard
> In spring-time from the Cuckoo-bird,
> Breaking the silence of the seas
> Among the farthest Hebrides.

And he readily provides his own speculation as to the song's content:

Perhaps the plaintive numbers flow
For old, unhappy, far-off things,
And battles long ago:
Or is it some more humble lay,
Familiar matter of to-day?...

The woman in the fields is not important in herself but only in providing the passing poetic visitor with a memorable satisfaction, a music in his own heart which is certainly no longer heard as a work-song to relieve the daily backbreaking effort.

I saw her singing at her work,
And o'er the sickle bending;—
I listened, motionless and still;
And, as I mounted up the hill,
The music in my heart I bore,
Long after it was heard no more.

As a young Terence (sic) Eagleton once remarked, he has 'had his fill of her'.

In 'The Leech-Gatherer, or, Resolution and Independence' the speaker is now 'a traveller then upon the moor', but again preoccupied with his own shifting emotional moods, until:

Now, whether it were by peculiar grace,
A leading from above, a something given,
Yet it befell that, in this lonely place,
I saw a Man before me unawares:
The oldest man he seemed that ever wore grey hairs.

This time a question is actually posed to this (curious) figure:

And him with further words I thus bespake,
"What occupation do you there pursue?"

The man's answer is quite explicit:

He told, that to these waters he had come
To gather Leeches, being old and poor:
Employment hazardous and wearisome!
And he had many hardships to endure;

But, while the old man elaborates on his hard life, the speaker is no longer listening – but again contemplating his own emotional state:

The Old-man still stood talking by my side;
But now his voice to me was like a stream
Scarce heard; nor word from word could I divide;
And the whole Body of the Man did seem
Like one whom I had met with in a dream;

Some thirty lines after the question was put, the poet has sufficiently failed to attend to the answer that he asks the same question:

– Perplexed, and longing to be comforted,
My question eagerly did I renew,
"How is it that you live, and what is it you do?"

And the old man patiently repeats the answer:

He with a smile did then his words repeat;
And said that, gathering Leeches, far and wide
He travelled ..

but again:

While I these thoughts within myself pursued,
He, having made a pause, the same discourse renewed.

This is a new twist in the 'iconoclasm of attention' or inattention. The object which is the ostensible focus is in effect ignored, even potentially eradicated, displaced by a concern only with the emotional state which it – even when the 'it' is a human being – has satisfactorily stimulated in the ostensible observer or listener. Precisely as Wordsworth claimed in the Preface added in 1800:

> the feeling therein developed gives importance to the action and situation, and not the action and situation to the feeling.

The specific content of what is being attended to is dissolved into a 'feeling' in the poet or reader which is not even particularly stimulated by the ostensible object of the attention but rather by the selective act of attending to it. As with Gostling's procedure, I am to find something 'curious' (or poignant or moving or sad or exciting etc.) because *I* find it curious, and so on. Whether 'it' is a human being, an odd brick, a whole cathedral. Or a window which I 'feel' is idolatrous.

The last poem in the 1798 *Lyrical Ballads* was 'Lines written a few miles above Tintern Abbey, on revisiting the banks of the Wye during a tour, July 13, 1798' where the reference in the title to Tintern Abbey results in no

actual mention within the poem of this unmistakably monastic ruin, which has become merely a 'sight' to include 'during a tour' and a kind of map-reference for an emotion-laden memory, though the unspoken history of the site also summons a certain resonance and thereby implicitly supports an appeal to a quasi-supernatural or vaguely divine component in that memory. The abbey provides a rather more complex example of an iconoclasm of attention, even a new mode of dissolution, as a dissolving of the object into a kind of subjective idealism.

cabinet of curiosities

Gostling's attitude can be characterised more simply. The cathedral is now a 'cabinet of curiosities', not in the pre- or quasi-scientific sense of Bargrave's collection, but as implying an even more miscellaneous categorisation. What is noticeably absent is the ostensible function and purpose of the entire building: the worship and glorification of God – a matter which gets barely a mention in the entire Gostling volume. He occasionally alludes to the previous function of some part of the building but only to point to its current wholly secular use, so that the vaults of the crypt now store the coal supply for the first Prependary, and the little chantry of Henry IV is now a lumber storehouse for the cathedral workmen.

He includes a telling anecdote, taken from Erasmus's account of his visit, which offers almost an allegory of what Gostling himself is now providing. Gostling writes, concerning Becket's shrine:

> Erasmus observed of the richness of its ornaments: to which he adds, that when this glorious show was offered to view, the prior took a white wand and touched every jewel, telling what it was, the French name, the value, and the donor of it; for the chief of them were the gifts of monarchs, or persons of distinguished rank or fortune.

The shrine itself is already a kind of 'cabinet' of very valuable curiosities, and the stories told on one's visit, or tour, were no longer those tales told of individual miracles, once recorded by the monk Benedict and still depicted in the sequence of 'Miracle Windows' which line the ambulatory around the shrine.

Nevertheless, alongside such mediaeval pilgrim hope or modern tourist gossip, there is still a moment which many a visitor will recognise today: looking up into the inside of the Bell Harry tower. Gostling rightly says, of the view upwards from the crossing, to which he makes a point of bringing his visitor:

> my stranger will be entertained with a fair inside view of that noble tower Bell Harry steeple, very lofty and spacious; not crowded with

> ornaments indeed, but by no means so plain as to stand in need of them.
>
> To look up to the arch over head from the foot of these steps, is much more agreeable to many, than to do it from the landing-place at the top of them; where the descent so near our feet, and the height of what we see so perpendicularly over us, is apt to confuse the sight and make the head giddy . . .

One almost expects the word 'sublime', but Gostling the ever-practical guide adds:

> or, if it does not so, the very posture soon grows painful to the neck and eyes.

And he provides a helpful footnote:

> A pleasant and effectual way to avoid the inconveniences herein mentioned, is to hold a pocket looking-glass before the breast, in a posture pretty near level; looking down to this will give no pain to the head, the neck, or eyes, and prevent the unsteadiness of the sight in a constrained posture. The pocket perspectives, or opera glasses, contrived to give a view of objects at which they do not seem to be pointed, are very convenient for the examination of ceilings and arches enriched with paintings or sculpture; but they are not every where to be had, and require some practice before they can be made use of readily. Another hint may perhaps be welcome to my reader, which every one, even among the curious, is not acquainted with, though of great service to such observations as we are here engaged in making.

He goes to on to explain in some detail how to use a telescope to create a 'macro-focus' or zoom lens in order to read faded inscriptions. It is characteristic that the eye-glass he particularly recommends is the kind which allows one to see obliquely something other than the object one is actually supposed to be looking at. Perhaps pretty faces covertly observed in a theatre audience.

The comment recalls Gostling's fascination with the theatrical potential of fireworks rather than with the military use of gunpowder, and could also be cited again in relation to the figure whose tomb is immediately below this defaced window, the 13th-century Franciscan Archbishop John Pecham whose work on optics can in part be plausibly credited with contributing to the early development of such spectacles and eyeglasses. We will consider him shortly.

Again, it is tempting to situate Gostling's form of tourism within a general history and theory of distraction, including the role of mechanical apparatuses or technology, from the development of tourism in its

somewhat domesticated form in late 18th-century England to, say, the popular genre of television 'travel show', on that domestic version of a 'cabinet' of curiosities. By 1774 gout-ridden Gostling had been an armchair tourist for nearly twenty years. One might outline the several modes of distraction from the real object provided by so much screen activity of various kinds and elaborate upon Walter Benjamin's classic essay on the work of art in the age of mechanical reproduction.

There is an even more apposite passage in Benjamin which provides a complex gloss upon the tentative notion of an iconoclasm of attention, in its relationship to both connoisseurship and the reduction of artistic and cultural response to a matter of sensibility and feeling, a variety of 'curiosity'.

In a fragmentary methodological essay associated with his preliminary work on Baudelaire which was to develop into the Arcades Project, Benjamin considered what had happened to the very notion of 'taste' and with it the criteria and practice of art.

> Taste evolves with the decisive predominance of commodity production over every other kind of production. The manufacture of products as commodities for the market leads to the conditions of their manufacture—not only the social in the form of exploitation, but also the technical—becoming increasingly removed from the world of the observer. The consumer, who is more or less expert when giving an order to a craftsman—the master craftsman himself instructs him as the case arises—is, as a buyer, usually without expert knowledge. Moreover, mass production, which aims at turning out cheap commodities, must disguise poor quality; it is actually in its interest that the buyer has little expertise in most cases. The more industry advances, the more perfect are the imitations it floods onto the market.

Benjamin cites a speech on trademarks by Chaptal, delivered on 17th July 1824:

> 'Let it not be objected that the customer, when he goes shopping, will, after all, be familiar with the different qualities of a fabric. No, gentlemen, the consumer cannot judge them: he merely goes by appearance, relying on sight and touch. But is looking and touching sufficient to give an account of the durability of the colours, or to tell how fine a fabric is, or the quality and manner of its finish?'

Benjamin comments:

> In the same measure as the consumer's expertise declines, the importance of his taste grows – for him and for the manufacturer. For the consumer, it serves as a sophisticated cover for his lack of expertise.

> For the manufacturer, it has the value of a new incentive to consume, which may be satisfied at the expense of other needs of consumption that would be more costly for the manufacturer to meet.

Benjamin is here beginning to think about the implications of certain streets in Paris being reconstructed literally to high-light the practice of what becomes known as 'window shopping'.

His insights could also apply to a whole city being turned over to and made economically dependent upon that form of *flaneur* or 'walker' we call the tourist, often preserving or generating a small inner area at the heart of the city which has almost but not entirely lost its 'aura'. Benjamin adds:

> It is precisely this development which literature reflects in *l'art pour l'art*. This doctrine, and its corresponding practice, for the first time gives supremacy to taste in poetry. . . In *l'art pour l'art*, the poet for the first time confronts language in the same way the buyer faces the commodity on the open market. He has lost his familiarity with the process of its production to an especially high degree. . . The poet of *l'art pour l' art* seeks above all to express himself through language—with all the idiosyncrasies, nuances, and imponderables of his nature. . . At the end of this development stands Mallarmé and the theory of *poésie pure*. In this theory, the poet has withdrawn from the cause of his own class to such an extent that the problem of literature without an object takes centre stage. This discussion takes place not least in Mallarmé's poems, which revolve around the *blanc*, the *absence*, the *silence*, the *vide* . . These difficulties make this poetry esoteric.

Again, one remembers the iconoclast Hering who in his letter to Cromwell had left quite unclear what 'the true nothing' might be. A 'literature without an object' was now a version of an iconoclasm of attention facing two ways, the self-regard of a poet and the mild curiosity of an audience. But it was not the only alternative in the late nineteenth century.

William Morris

A century after Gostling's *Walk* a letter appeared in *The Times* for 4th June 1877:

> I venture to hope that you will give me space for a word or two on the subject of the restoration of the Choir of Canterbury Cathedral. As to the present woodwork at the west end, it seems superfluous to praise it, as it is agreed on all hands that it is good, though in some people's minds I suppose it would be condemned as inherently unholy, because it is a post-Reformation work. But, good as it is, I cannot conceive

> what purpose it can serve when it is taken away from the place it was made for, and in which it looks both dignified and serious, as well as elegant; furthermore, what is to be the fate of the present stone screen when Sir Gilbert Scott's conjectural restoration of Prior Eastry's work is carried out? It is true that its surface has been destroyed by restoration, but it has been at least a fine work of a good date. Sir, I think that our ancient historical monuments are national property and ought no longer to be left to the mercy of the many and variable ideas of ecclesiastical propriety that may at any time be prevalent among us.

The letter was signed by 'William Morris, Hon, Sec. of the Society for the Protection of Ancient Buildings'. The Dean of Canterbury replied: 'Mr Morris's Society probably looks on our Cathedral as a place for antiquarian research or for budding architects to learn their art in. We need it for the daily worship of God.' To this and other comments Morris responded, 7th June 1877:

> He is mistaken in reading my letter as an approval of the schemes of restoration now afoot: on the contrary, I implied that the removal of the stalls now proposed would practically destroy a worthy work of art . . . I am glad to hear from the Dean that he dreads paint in restoration, though it is by no means the only thing to fear; but I protest strongly against the charge that I consider the ancient painted work of our churches coarse daubing. I look on it rather with the greatest interest, and know that the art in it is often great, however rude it may be: it is the unfeeling and dead imitation of it so rashly practised in restoration that I condemn.
>
> For my part, remembering well the impression that Canterbury Cathedral made on me when I first stood in it as a little boy, I must needs think that a great building which is obviously venerable and weighty with history is fitter for worship than one turned into a scientific demonstration of what the original architects intended to do: I think that these learned restorations are good on paper to be kept in portfolios, but not good in new stone for the use of people who are busy and in earnest.

Jack Lindsay provides a context for that memory of Canterbury Cathedral:

> The Morrises were Evangelical, and the children were taught that Unitarians were very bad people and Dissenters not respectable. They were not allowed to mix with any but Quakers . . He used to be taken to a dull church . . In 1875, discouraged with drawing [classes], he said, 'So I keep it up dreading the model day like I used to dread Sunday when I was a little chap.' . .

> An important event occurred when he was eight years old. His father took him to see Canterbury Cathedral . . 'The first great church he saw,' says May [Morris], 'and the long nave and great columns and painted glass made an impression on the young mind that lasted all his life. Swift perception and retentive memory were indeed among Heaven's gifts to him: here he was, at the age of eight, so excited by the majesty of the building that in some queer way he took in and registered in his child's brain facets of the famous architecture the significance of which the child could not understand, but which were the beginnings of his store of knowledge of such things.' He thought, he said, 'that the gates of heaven had been opened' to him; but oddly he never seems to have later revisited the site. On the same holiday he was shown the Minster of Thanet; and fifty years later, without having seen the building since, he described it in some detail. Of the early visit to Canterbury and his first sight of an illuminated manuscript, Morris said, 'These are the first pleasures which I discovered for myself were stronger than anything else I have had in life.'

By contrast with the 'dull' Evangelical Church, Morris later insisted upon the colourfully painted and indeed illuminated look of a Gothic cathedral, which I referred to earlier as the 'visible species' of the mediaeval church interior:

> It must be admitted, I think, that during this epoch [early 14th century], as far as the art of beautiful building is concerned, France and England were the architectural countries par excellence; but all over the intelligent world was spread this bright, glittering, joyous art, which had now reached its acme of elegance and beauty: and moreover in its furniture, of which I have spoken above, the excellence was shared in various measure betwixt the countries of Europe.
>
> And let me note in passing that the necessarily ordinary conception of a Gothic interior as being a colourless whitey-grey place dependent on nothing but the architectural forms, is about as far from the fact as the corresponding idea of a Greek temple standing in all the chastity of white marble. We must remember, on the contrary, that both buildings were clad, and that the noblest part of their raiment was their share of a great epic, a story appealing to the hearts and minds of men. And in the Gothic building, especially in the half-century we now have before us, every part of it, walls, windows, floor, was all looked on as space for the representation of incidents of the great story of mankind, as it had presented itself to the minds of men then living; and this space was used with the greatest frankness of prodigality, and one may fairly say that. wherever a picture could be painted there it was painted.

Morris had castigated the old decision to replace the Canterbury 12th-century north west tower with what his colleague W. R. Lethaby called 'a nineteenth century fifteenth century erection', the quasi-facsimile of the south-west tower which has created that familiar photogenic symmetrical west end loved by tourist photographers today. But over and above such local connections with Canterbury two elements in Morris's position are relevant.

The English 18th-century debate on 'Taste' did not need to result in a coherent aesthetic theory if its primary function was not to explain works of art but to bring together a new composite elite partly characterised by their apparent commitment to the appreciation of 'works of art'.

An alternative but related problematic was developed by William Morris. When Morris and Philip Webb built what became known as the Red House in 1860 they not only designed the house itself in creative response to what was already established as the 'Gothic' revival, but also in seeking appropriately to furnish and decorate the house, they tried to revive what they conceived to be the practices of a mediaeval work-shop. In Morris's view, partly indebted to Pugin and Ruskin, the mediaeval craftsman was not merely a worker mechanically implementing someone else's designs, but an active and creative contributor, responsible for endlessly varied and unique artefacts, whether stone carvings, timber fittings, or woven tapestries. One model had been cathedral craftsmen.

By setting up a firm dedicated to the production of such artefacts Morris and his partners explicitly modified the very notion of a 'work of art' so that the emphasis fell upon all forms of work as, potentially, forms of art. In particular, Morris's objective was not to produce 'works of art' destined for gallery display or the art market, but primarily to transform the ordinary living spaces of any house so that it contained nothing that was not either practically useful or considered to be beautiful: work as art. This included the everyday tools and implements of kitchen and dining room, the fabrics of sitting room and bed-room, the curtains and the wallpaper, the very clothes of the inhabitants, and the arrangements of flowers and plants, pathways and trellises in the garden. The house itself was to be not simply a superficial aesthetic experience but a substantial work of arts and crafts. Whether one shares Morris's particular notion of such a total domestic 'visible species' is another matter, and from one sceptical angle it was simply another variation upon establishing a cultural consensus for a composite class.

The more radical social, political, and economic implications of Morris's position were increasingly spelt out in his later commitment to the socialist movement. Its fundamental premise was perhaps most characteristically formulated in a letter to the *Manchester Examiner,* 14th March 1883. Morris was responding to a complaint that his lecture on 6th March, 1883, entitled 'Art, Wealth, and Riches', at the Manchester Royal Institution, raised 'another question than one of mere art' :

> Sir, – It was the purpose of my lecture to raise another question than one of 'mere art.' I specially wished to point out that the question of popular art was a social question, involving the happiness or misery of the greater part of the community. The absence of popular art from modern times is more disquieting and grievous to bear for this reason than for any other, that it betokens that fatal division of men into the cultivated and the degraded classes which competitive commerce has bred and fosters; popular art has no chance of a healthy life, or, indeed, of a life at all, till we are on the way to fill up this terrible gulf between riches and poverty.
>
> . . I could never forget that in spite of all drawbacks my work is little else than pleasure to me; that under no conceivable circumstances would I give it up even if I could. Over and over again have I asked myself why should. not my lot be the common lot. My work is simple work enough; much of it, nor that the least pleasant, any man of decent intelligence could do, if he could but get to care about the work and its results. Indeed I have been ashamed when I have thought of the contrast between my happy working hours and the unpraised, unrewarded, monotonous drudgery which most men are condemned to. Nothing shall convince me that such labour as this is good or necessary to civilization.

It was an essential part of Morris's overall practice that his commitment to producing such works of art should involve him personally in learning the appropriate craft. This included reviving the mediaeval modes of producing stained glass and there is a detailed letter to Ruskin in the same year 1883, worth having to hand as we look at the stained glass in Canterbury:

> We paint on glass; first the lines of draperies, features & the like, with an opaque colour which when the glass is held up to the light is simply so much obscurity; with thinner washes and scumbles of the same colour we shade objects as much as we deem necessary, but always using this shading to explain form, and not as shadow proper. . . Finding that it was difficult to get a flesh-coloured glass with tone enough for the flesh of figures, we use thin washes of a reddish enamel colour to stain white glass for flesh-colour & sometimes, though rarely, for other pale orange tints: N. B. this part of our practice is the only point in which we differ from that of the medireval glass-painters.
>
> . . We use a yellow stain on white glass (or on blue to make greens): this is chiefly done by means of silver, is quite transparent & forms part of the glass after firing; it may therefore be considered rather a diffusion of the colour in the glass than a painting on it.

The body of the glass is of two kinds, first what is technically called pot-metal, in which the colouring matter is fused with the glass, & is essentially part of it: and 2ndly what is called flashed glass, in which a white body is covered with a coloured skin: this is done by the workman taking on the end of his hollow rod first a large lump of white metal, then a small dip of coloured metal; he then trundles the lot, making a disk like a small piece of crown glass. This kind of glass however is not much used except for the red coloured by copper called technically 'ruby glass', this owing to its make is often curiously and beautifully striped & waved: this glass is, I must tell you, perilous to fire the painted colours upon, as the kiln generally changes it more or less, sometimes darkening it almost to blackness, sometimes carrying the colour away: to avoid this risk we are sometimes obliged to paint the necessary lines on a piece of thin white glass & lead up the two together: this, which is called plating I have sometimes done with two pieces of coloured glass, to get some peculiar tint: one must be careful not to overdo the process however, or you will get a piece of glass at once cumbrous & liable to accident.

I should mention that all the glass is very thick: and that in some of the pot-metals, notably the blues, the difference between one part of a sheet and another is very great. This variety is very useful to us in getting a jewel-like quality which is the chief charm of painted glass – when we *can* get it. You will understand that we rely almost entirely for our colour on the actual colour of the glass; and the more the design will enable us to break up the pieces, and the more mosaic-like it is, the better we like it.

Canterbury Cathedral now has a moderately appealing window by a follower of Morris in the Arts and Crafts movement, Christopher Wall's west window in the south-east transept. But anyone who has considered the difference in quality between the original late mediaeval glass in Canterbury cathedral and that produced by 19th-century practitioners, for example in the Chapter House, might also consider a comment by Ruskin himself in an appendix to the *Stones of Venice* (Vol 2, Appendix 12: Modern Painting On Glass):

All art, working with given materials, must propose to itself the objects which, with those materials, are most perfectly attainable; and becomes illegitimate and debased if it propose to itself any other objects, better attainable with other materials.

But of all the arts, the working of glass is that in which we ought to keep these principles most vigorously in mind. For we owe it so much, and the possession of it is so great a blessing, that all our work in it should be completely and forcibly expressive of the peculiar characters which give it so vast a value.

These are two, namely, its DUCTILITY when heated, and TRANSPARENCY when cold, both nearly perfect. In its employment for vessels, we ought always to exhibit its ductility, and in its employment for windows, its transparency. All work in glass is bad which does not, with loud voice, proclaim one or other of these great qualities. . .

In the case of windows, the points which we have to insist upon are, the transparency of the glass and its susceptibility of the most brilliant colors; and therefore the attempt to turn painted windows into pretty pictures is one of the most gross and ridiculous barbarisms of this pre-eminently barbarous century. . . It is a two-edged error, striking in two directions; first at the healthy appreciation of painting, and then at the healthy appreciation of glass.

Color, ground with oil, and laid on a solid opaque ground, furnishes to the human hand the most exquisite means of expression which the human sight and invention can find or require. By its two opposite qualities, each naturally and easily attainable, of transparency in shadow and opacity in light, it complies with the conditions of nature; and by its perfect governableness it permits the utmost possible fulness and subtlety in the harmonies of color, as well as the utmost perfection in the drawing.

Glass, considered as a material for a picture, is exactly as bad as oil paint is good. It sets out by reversing the conditions of nature, by making the lights transparent and the shadows opaque; and the ungovernableness of its color (changing in the furnace), and its violence (being always on a high key, because produced by actual light), render it so disadvantageous in every way, that the result of working in it for pictorial effect would infallibly be the destruction of all the appreciation of the noble qualities of pictorial color.

In the second place, this modern barbarism destroys the true appreciation of the qualities of glass. It denies, and endeavors as far as possible to conceal, the transparency, which is not only its great virtue in a merely utilitarian point of view, but its great spiritual character; the character by which in church architecture it becomes most touchingly impressive, as typical of the entrances of the Holy Spirit into the heart of man; a typical expression rendered specific and intense by the purity and brilliancy of its sevenfold hues; and therefore in endeavoring to turn the window into a picture, we at once lose the sanctity and power of the noble material, and employ it to an end which is utterly impossible it should ever worthily attain. The true perfection of a painted window is to be serene, intense, brilliant, like flaming jewellery; full of easily legible and quaint subjects, and exquisitely subtle, yet simple, in its harmonies. In a word, this perfection has been consummated in the designs, never to be surpassed, if ever again to be

approached by human art, of the French windows of the twelfth and thirteenth centuries.

Ruskin seems to me here on the verge of an iconoclasm of content though at the last twist he allows 'easily legible and quaint subjects', itself almost a variation on the appeal of the 'curious'. But the emphasis upon understanding the process as the basis for an appreciation of the product is firmly stated and constitutes a premise for the larger political case he advances. In another appendix to the same volume Ruskin offered a comment directly relevant to our theme, 'Proper sense of the word Idolatry':

> The Church of Rome does indeed distinctively violate the second commandment; but the true force and weight of the sin of idolatry are in the violation of the first, of which we are all of us guilty, in probably a very equal degree, considered only as members of this or that communion, and not as Christians or unbelievers. Idolatry is, both literally and verily, not the mere bowing down before sculptures, but the serving or becoming the slave of any images or imaginations which stand between us and God, and it is otherwise expressed in Scripture as "walking after the Imagination" of our own hearts.
>
> And observe also that while, at least on one occasion, we find in the Bible an indulgence granted to the mere external and literal violation of the second commandment, "When I bow myself in the house of Rimmon, the Lord pardon thy servant in this thing," we find no indulgence in any instance, or in the slightest degree, granted to "covetousness, which is idolatry" (*Col.* iii. 5; no casual association of terms, observe, but again energetically repeated in *Ephesians,* v. 5, "No covetous man, who is an idolater, hath any inheritance in the kingdom of Christ"); nor any to that denial of God, idolatry in one of its most subtle forms, following so often on the possession of that wealth against which Agur prayed so earnestly, "Give me neither poverty nor riches, lest I be full and deny thee, and say, 'Who is the Lord?'"

The practice of quoting biblical texts was clearly still alive, though not quite for the same purposes as the seventeenth century iconoclasts. For Ruskin 'covetousness' is the idolatrous god of capitalism. Arthur Hugh Clough phrased it differently, in 'The Latest Decalogue':

> Thou shalt have one God only; who
> Would be at the expense of two?
> No graven images may be
> Worshipped, except the currency:

Marx preferred the term 'the fetishism of commodities', indicating a finally barbarous iconoclasm of attention whereby the usefulness of every object is displaced by and subordinated to its value in exchange.

Among the several crafts which Morris revived, reinvigorated, and taught himself was that of book design and production and it is perhaps appropriate that perhaps the most extraordinary product of his influential Kelmscott Press was an edition of Chaucer's *Canterbury Tales,* though the whole book- production side of The Firm might be regarded as a rather curious conflation of vanity press and self-publishing. Morris's last public speech concerned a less benign development: he seconded a motion at the Society of Arts against the proliferation of public advertising. He would probably have fully concurred with Benjamin's remarks on what had happened to taste and to the work of art in the age of advertising.

Monet

Let me again return, in my crab-wise fashion, to Canterbury Cathedral and its windows by bringing into play three specific works with implications for how we might further respond to this smashed Royal Window, its visible traces of iconoclasm, and the continuing relations between theology and art.

One aspect of Morris's case concerned a fore-grounding of the material of a specific art as the necessary foundation for the appropriate production of art-work, the very working of an art, an emphasis echoed in Ruskin's remarks about painting and its materials, oil, light, colour, shadow, opacity, and transparency.

A series of works by Claude Monet begun in 1892-3 is sometimes referred to as his Cathedral paintings or Rouen paintings. Which is problematic. Monet said that what he was trying to paint in these thirty or so works was not Rouen Cathedral, or indeed any cathedral at all, but what lay *between* what he called the 'motif' and himself:

> A motif for me is nothing but an insignificant matter – what I want to reproduce is what there is between the motif and myself.

It was not a representation of Rouen Cathedral that he was painting; nor was it a record of his feelings or emotional response to whatever he or we might take the Cathedral or a cathedral to symbolise. His focus, literally, was upon the '*enveloppe*', that evanescent composition of sunlight and shade, atmosphere and moisture, which was visible to him at any particular moment in a day, and which he regarded as occurring between his vantage point and the facade of the cathedral. His viewpoint was not in the open air but at an open window, as five different rooms just across from the Cathedral were at times transformed into temporary studios so that Monet could move from canvas to canvas, working on each one as the day-light changed. And yet each subtly different painting of a different time of the

day was able to be re-worked from memory with patient exactness over several further months. The series was finished in his home studio in 1894.

Joachim Pissarro once wrote:

> Monet painted the air, the so-called *enveloppe* – an invisible amalgamation of air, light, moisture and temperature that alters our perception of what we see. What usually we do not see (what Monet calls the envelope) colours and transforms the visible. The reality, the subject matter in itself – the Cathedral – is therefore not as important as what is around it – the invisible envelope that makes the Cathedral more or less visible, that confers upon it its hues and shades, sharpens or blurs its edges, that enhances or even erases its crevices, brings out or flattens its reliefs.

Monet's painterly mode has been variously labelled, as Analytic Impressionism or even Scientific Impressionism: the recording or capture in paint of the exact interplay of light and atmospheric effects in relation to the changing colours visible as the daylight moved across the stone before him. One could again deploy the phrase 'an iconoclasm of attention' or perhaps a 'painting without an object', as denoting this highly selective perception, a form of abstraction from the apparent object, yet not simply an oblique or askew perspective as in Gostling's sideways opera glasses, but almost a focusing upon the intermediate image generated within a viewing apparatus, not a variable-focus telescope but the physical eye itself. Monet's practice might also be regarded as a further variation upon the relation between the ostensible 'content' and the 'feelings' or response aroused in the artist.

Yet, despite Monet's claim that the 'subject' or object of his painting was not Rouen Cathedral itself, still less its religious significance or cultural associations, for most ordinary viewers of these works that is indeed what they are: rather peculiar paintings *of* or indeed *not* of. At that late 19th-century juncture in the tradition of European painting, the fissure between the specific concerns of the professional practitioner and the responses or expectations of the average viewer of paintings becomes deeply entrenched, so that the 'popular' response to contemporary art developments can be described as latently and hostilely iconoclastic.

When (and for the only time) this sequence of more than twenty works was exhibited together, one journalist sarcastically remarked that if it was the *enveloppe* not the Cathedral that was significant for Monet, perhaps Monsieur the artist should devote his next painting entirely to a single block of stone. A different exhibition arranged in May 1908 was due to show Monet's work from the previous three years, a selection of paintings with a value estimated by the dealers at $100,000 (1908 prices). Just before the opening a dissatisfied Monet himself destroyed all the paintings with a knife

and a paint brush. One critic commented, in the *New York Times*, 'It is a pity, perhaps, that some other painters do not do the same.'

That these Rouen works formed a series and that the series has never since been viewable together is worth comment. Whatever the specific rationale in terms of Monet's own aesthetic notions, and in particular the attempt to incorporate or make evident the dimension of time itself, the production of several differentiated paintings which nevertheless constituted variations upon a single *motif* can be seen as one long-lasting bye-product of the requirements of an increasingly voracious art market in conjuncture or collaboration with an art-collecting attitude which both demanded an individuality, a signature, and a multiplicity or indeed multiplication of appropriately priced and branded commodities by the same named Master. Everyone could then purchase their very own but highly recognisable 'Monet Cathedral' painting. Or a Warhol soap box or tin can, an ironic counter-Morris exemplar of the familiar domestic object transformed into mass-produced art.

Yet, of course, not 'everyone'. There is an increasing gap between the descendant of The Man Of Taste – now explicitly The Wealthy Collector in an Art Market – and a public for whom such developments as Analytical Impressionism, Post-Impressionism, Cubism, and so on, tended to provoke a deep bafflement and resentful scepticism, an overt hostility or at best a persistent indifference. The ideological function of the art market had, one might say, undergone a further 'mutatio', to use Eadmer's word in his *Historia novorum*. The ordinary viewing public still just wanted to *see the Cathedral*. But not like this.

And they still do. Since ordinary people come, in their thousands, every day, to see a real Cathedral. Yet there remains a problem, a question. One of the indirect responses to the sarcastic quip suggesting that Monet should simply paint (an image of) a block of stone was surely (after several intervening developments in the art market and its discourses) the notorious pile of bricks exhibited a few generations later by Carl André at the Tate Gallery in 1974 and the 'outrage' and 'scandal' occasioned by that exhibit: 'How could anyone believe that a pile of bricks is a work of art!!' – ranted the British tabloids. Not, in fact, during the exhibition itself but only as it seemed much later in 1976 that 'taxpayer money' was being wasted actually paying for a pile of second-hand bricks. The 120 'original' bricks had even been replaced by new ones, a fortuitous reinforcement of the point of the title 'Equivalent VIII', as a reference to a series of previous 'equivalent' works, in height, mass, and volume, each composed of 120 off-the-shelf bricks.

Leaving aside several specific and viable answers to the tabloid question in that particular case, there is also the point that thousands of people do indeed come to Canterbury to look at a pile of bricks. Bell Harry, the central tower of the cathedral, is actually some 400,000 bricks with a slight

facing of stone. Yet how many of those visitors would travel to see a work of 'modern art'?

For example, the Tate Gallery has in its collection a painting entitled *Cathedral* (1950) by an American artist Norman Lewis. The Tate website says:

> It represents a dense grid of black lines against a red ground, with highlights of white, yellow and blue paint. The grid itself is irregular, with the black lines covering most of the top of the canvas and the red ground more visible towards the bottom. The vertical and horizontal lines of the grid are also irregular, thickening in places. The sense of darkness and confinement suggested by the black grid is mitigated by accents of luminous colour and by a playful rhythm in the recurrence of circular and spiral lines.

There is a digital image of the work on the Tate website but the picture might loosely be imagined from that description, and it doesn't 'look like' a cathedral.

As with Carl André, it is worth retracing a certain lineage here. We might go back to Turner's own painting of *Rouen Cathedral* or even his *Christ Church Gate Canterbury*, more or less contemporary with Gostling and Wordsworth, but let us instead pick up the story later.

In 1929 Kasimir Malevich wrote (with a side-glance at current Soviet orthodoxy):

> The *Cathedral of Rouen* is of capital importance for the history of art and, by the strength of its action, forces whole generations to change their conception. . . In the *Cathedral of Rouen* we do not see that the painter took care to render the images [of the cathedral itself which] . . is not so important, with regard to the pictorial relationships, and to the changes of coloured elements. For most people, such paintings, with all their changes, are not worth anything because they do not depict the world in a concrete manner . . It is not possible to say that Claude Monet has reflected bourgeois religious ideology in the *Cathedral of Rouen*, and this is because Monet worked first and foremost on the predominantly physical changes of light.

By then, of course, Malevich was himself (in-)famous as the creator of the monochrome painting usually entitled *Black Square*, first exhibited in 1915 in Petrograd and deliberately hung on that occasion in a top corner angle just beneath the ceiling of the exhibition space, in direct imitation of the usual location for a domestic icon of a saint in an Orthodox Russian household. In 1997, Alexander Brener painted a green dollar sign onto Malevich's painting *Suprematisme*. He explained his apparent act of iconoclastic attack: "The cross is a symbol of suffering, the dollar sign a symbol of trade and

merchandise . . What I did was not against the painting. I view my act as a dialogue with Malewitz."

Mentioned earlier in relation to the idiosyncratic interregnum proposal that churches be painted black, in 1971 the Rothko Chapel in Huston was opened, essentially constructed around fourteen very large canvases by Rothko, almost super-sized Malevich squares, painted in a monochrome purple-black, though the apparent hue of the paintings varies subtly, like Monet's, as the light changes during the day. In 2012 a mural by Rothko in Tate Modern was predictably vandalised by a man claiming to be commenting on contemporary art. In front of the Rothko Chapel is a sculpture by Barnett Newman, entitled *Broken Obelisk*.

Newman's own *Cathedra* (1951) consists of a very large canvas, entirely painted in monochrome blue apart from a single vertical white line called a "zip" by Newman, which he said was intended to define the 'contradictory' spatial structure of the painting by both dividing and uniting the two split sides of the canvas. Though valued at $12 million, not everybody was impressed and in 1997 *Cathedra* was slashed with a knife by Gerard Jan van Bladeren. In 1986, a man 'wishing to take revenge on abstract art' cut with a knife the painting *Who's Afraid of Red, Yellow and Blue III* by Newman. The restoration took five years and allegedly cost $450,000. After serving a prison sentence, the offender slashed another Newman painting.

Black is not the only colour. The catalogue of a retrospective exhibition at the Pompidou in 2007 devoted (the word seems apt) to the work of Yves Klein says, rather confusingly:

> Exhibited in 1955 under the title *Yves, Peintures*, the first Monochromes were multicoloured. It was to make them more capable of carrying out the function that Yves Klein assigned to painting – to invest a space with sensibility – that he restricted them in 1957 to the colour blue alone, blue being the colour of the sky.
>
> The Blue Monochromes, initially called "monochrome propositions of the blue period", were presented to the public for the first time at the Apollinaire gallery in Milan. . . The eleven canvasses, although identical, were not appreciated equally by the public: they were sold for different prices. Klein concluded that each painting, as well as its material reality, was impregnated with an immaterial quality that made it distinct from the others.

Chaptal's remarks on trademarks come to mind. As do Benjamin's on the relation between art for art's sake and emptiness, Mallarmé's poems and *blanc, absence, silence, vide*. And so on. The Pompidou commentary continues:

> He created ephemeral and immaterial works, such as the release of 1001 blue balloons into the sky in Paris in 1957, an exhibition

> consisting of an empty art gallery in 1958, and the sale of "immaterial pictorial sensitivity zones" in 1959.
> . . In the continuation of his work on pictorial space, Klein turned his attention to space itself, in other words the void, as specified in his theory of impregnation.
> . . One of his first productions on the theme of the void was the famous exhibition "of the void" in 1958, entitled *La spécialisation de la sensibilité à l'état matière première en sensibilité picturale stabilisée* [The specialisation of sensibility in the raw material state into stabilised pictorial sensibility]. For this exhibition, Klein himself impregnated the space with artistic sensibility using blue as an intermediary. Indeed, whereas the interior space of the empty gallery was painted entirely in white, parts of the exterior were decorated in blue: the display window was painted blue, visitors were met by a blue curtain, the invitation cards and stamps were blue, and even the cocktails offered by the artist were tinted with methylene blue. Thus the white space of the gallery could be perceived as being contaminated by the blue.

One might, I suppose, propose that Canterbury choir was once 'contaminated' by the multicoloured glass of its windows, or that the the vast empty gallery space of the cathedral nave is now impregnated with the artistic sensibility, or otherwise, of its annual million visitors or so. Perhaps the gift shop should organise the sale of "immaterial pictorial sensitivity zones" in the Cathedral, as I recall Liverpudlians once selling bottles of 'River Mersey' municipal tap-water to American Beatles fans.

Certainly, the Cathedral – or at least the notion of 'cathedral' – has haunted or contaminated a great deal of modern art. We could scamper through, say, Klee's *Cathedral* (1924), Kurt Schwitters' *Merzbau*, also called *Cathedral of Erotic Misery*, Damien Hirst's *Bringing Forth the Fruits of Righteousness from Darkness*, described as 'designed to resemble a trio of stained-glass windows from a Gothic cathedral [that] almost seems to emit light', or maybe Phillip Johnson's *Glass House*, the *Roofless Church*, the *Crystal Cathedral*. With an eye on the word 'cathedra', as an Archbishop's throne, I might include Joseph Kosuth's almost canonical *One and Three Chairs* (1965), in which a chair, a photograph of that chair, and the dictionary definition of the word 'chair' are installed side-by-side, though it might be imprudently explicit to bring in the overtones of French 'chair' as 'flesh' and discuss the real presence or 'this is my body'. Though we could return to that particular point.

Some modern artists have of course actually made stained-glass windows for cathedrals, and Paul Kos, for example, has tried to emulate them in contemporary media, as in his *Chartres Bleu*, 1986, exhibited at SFMOMA, which deployed 27 video monitors to emulate a 13th-century stained-glass window in Chartres cathedral. I am reminded of a conversation in Canterbury Cathedral precincts when a large modern building was being

constructed and I asked what it was for. 'We're trying to provide an overall interactive multimedia educational experience' was the reply. 'You've already got one', I perhaps ungraciously responded.

If it is the case that many of the thousands of visitors to the cathedral would resist, be puzzled by, or simply indifferent to, the development of visual art since Monet, can we ask what kind of reaction is actually involved when, as with the north-west transept window, we find ourselves at least half- consciously regretting the loss of 'a work of art'.

We can easily acknowledge that our visit to the cathedral is shaped not primarily by theological or devotional attitudes, but to some extent still a matter of aesthetic appreciation, and therefore however faintly as a hoped-for experience of truth and beauty. Though it's also worth asking how many of the visitors to the cathedral might then go in further search of truth or beauty or art, by visiting Canterbury's very own Beaney Museum and Art Gallery, recently renamed the Beaney House of Art and Knowledge. Which brings us back to iconoclasm. And to another work of art, admittedly only speculatively linked with Canterbury Cathedral and this particular window.

Duchamp & a big broken glass

A pleasing and even faintly plausible suggestion once emerged from a lively conversation with my late colleague Roger Cardinal as we visited a rather disappointing commemorative exhibition on Duchamp in Herne Bay.

On his month-long visit in August 1913 to that now somewhat depressing seaside resort a few miles from Canterbury, Marcel Duchamp apparently had his first encounter with the typical English vertical double-sash window, not at all common in France. Did this tall rectangular construction of glass and wood, with a central horizontal dividing bar and a traditional elegant ratio of its two overlapping vertical frames, contribute to the central design concept of Duchamp's *Large Glass*, or *The Bride stripped bare by her Bachelors, even*, which began to take definite shape over the next few months?

If so, it may be that Canterbury Cathedral also made a contribution to the ultimate, if not the chronologically final, gesture of an entire Western artistic tradition, in a work which almost transformed conventions of exhibition, as light passes through it and makes other spectators visible on either side of it: Duchamp called his object 'a delay in glass'.

We can certainly think of this work as a somewhat idiosyncratic stained glass window, if not technically stained-glass, incongruously placed in the middle of a room, whether private or public gallery, as an idiosyncratic (non-) window upon the art world. Though hand-crafted in its specific dimensions and material content, the large glass is also a recognisable physical variation on a double sash window and thus almost a version of a 'ready-made' – as indeed is another work in Duchamp's *oeuvre*, *Fresh Widow* (New York 1920), a French window.

It would be possible to re-trace (parodically) each of the notions of 'art as a window' sketched earlier, in terms of their various refractions through and reflections in Duchamp's work, including the early *Man Seated By A Window* (1907) and the final peep-hole of *Étant donnés*. The serendipitous fact that the original glass panes of the Large Glass were shattered, by their reciprocal impact upon each other during careless transportation, so that it now incorporates into its final form a ghost of that classic iconoclastic product, a deliberately smashed glass window, thereby almost enacting and enshrining the aesthetic iconoclasm that his *oeuvre* is often taken to represent: that of art against art rather than art for art's sake.

Since Duchamp spent an entire month chaperoning his teenage niece in that rather dismal English seaside town, it is unlikely that he failed to visit Canterbury and its famous cathedral. So I like to think of him as actually standing in front of this very Royal Window, and perhaps himself formulating a half-formed thought, a delayed realisation, a variation of a large glass.

A stained-glass window is, after all, a 'delay in glass', both a kind of momentary blockage or barrier to the passage of light and, for the viewer, a form of double-take, a delayed seeing-through, first the image, then the glass, and intermittently *vice versa*. The *Large Glass* incorporates several delays, with flexible variations: first we see the frame, looming large and oddly free-standing, an abandoned window, waiting to be installed. Then we most probably look through the glass to see several other people looking at it, peering through it, watching it and seeing us, as one does at a window, through what (recalling Monet's phrase) is physically 'between' us and the others, looking like us, realising the *motif* of the art spectator, now supplied with an impressive eye-glass or two-way transparent mirror glass of art.

We may then also oscillatingly re-focus on what is *on* the glass, which will also, surely, delay our eventual realisation that it is indeed a large window we are looking through and *at*, somewhat as a Cubist painting directs our gaze at the picture plane itself or a Mallarmé poem foregrounds the printed letters upon the page. Or as Alice looked through the looking glass, to find herself in a quasi-duplicate world.

If we also follow the implicit invitation to 'strip out' what we see, we may end up 'seeing' the process of seeing itself, another invisible *enveloppe*. The unavoidable sight of those other people looking at this work of art, visible to each other through its transparent glass, and like us wondering quite how to respond to it, might remind us of the advice, quoted earlier in *Clio*, which instructs a young lady how to behave in order to *appear* to be appreciating an artwork. We are on show, part of the show, ourselves under scrutiny.

We might be tempted to trace other associations to the Cathedral: the pivotal item in Duchamp's complex machinery of frustrated desire was, at one stage, going to be a bottle of Benedictine liqueur, arguably the only wholly legitimate sensual product of a community of celibate monks. Less

fancifully, perhaps, we can also suggest other facets of Duchamp's work as germane to the skeletal frame I have been sketching.

Some fifteen years after the *Large Glass* was abandoned unfinished, in 1923, and its enigmatic maker had ostensibly devoted himself to the challenges of chess, Duchamp chatted in a Paris cafe over coffee (and chess?) with Walter Benjamin, at that time formulating his argument on 'the work of art in the age of mechanical reproduction'. The same year, Duchamp began to assemble his *Boite*, a small box consisting of a collection of reduced material reproductions of all his major works, packed in such a way that when the box is opened the miniature *Large Glass* functions almost as the altarpiece of a portable altar, a once-familiar clerical travel-case which contained the minimal liturgical necessities to allow an itinerant priest, for example a military chaplain, to celebrate Mass. Duchamp's version of the boite even incorporates a triptytch. As a comment upon Benjamin's notion of mechanical reproduction and his almost contemporaneous thesis concerning the 'aura' of a work of art, Duchamp's *Boite* could hardly be more apt.

Then in 1940, as news of Benjamin's suicide while escaping the Nazis reached his friends, with frustrating reports of the loss of Benjamin's mysterious briefcase (did it contain his life-work, the Arcades Project . . .?), Duchamp – perhaps entirely serendipitously – decided upon a further variation of his reproduced *Summa* of his own work: the *Boite en valise* series, the box now in a briefcase, not unlike a travelling chess-set, but also incorporating a logical 'set' – the set of all his main works inside the box inside the briefcase. Though with characteristic mathematical wit Duchamp left open the Russellian 'set of sets' paradox or *aporia*: should the *Boite en valise* include this box, itself a major work, inside itself?

At the time of the *Large Glass* Duchamp was intrigued by the notion of a fourth dimension, a projection through the 3-D world, akin to the familiar painterly projection of the 3-D natural world through or upon the 2-D picture plane. He might have relished, had he known it, *Flatland*, the 1884 curious fiction by the curiously named Edwin Abbott Abbott which features two-dimensional inhabitants deeply puzzled by the passage through their flat space of strangely changing shapes, for them the utterly unimaginable 3-D protrusions and intrusions of (to us) ordinary objects into their own plane world. Edwin A. Abbott, as we saw earlier, wrote extensively about the miracles of Thomas Becket, enshrined in the 'Miracle Windows' of Canterbury Cathedral and thereby commemorating the intrusion into our own mundane space of the divine dimension, entering vividly through glass, as the virgin Mary had once, in traditional representations, conceived the divine. The Royal Window had been dedicated to Becket and to the Blessed Virgin, probably an image of her conceiving through a shaft of light.

Moreover, as with Benjamin's essay, Duchamp's gestures can be read as implicitly political. Duchamp was perhaps unique in his strategies for

effectively avoiding, or subverting, the usual procedures of the commercial art market. In effect, he had just one private collector, a persistent and privileged purchaser, with the result that nearly all his major work has remained as a single collection, now assembled in the Philadelphia Museum.

Yet at the same time, both the initial 'ready-mades' and the hand-crafted but made-to-order 'boxes' almost explicitly invited not just authorised multiple reproduction but also unofficial and even amateur imitation. Any enthusiast can make their own Boite *facsimile* with suitably cut-up postcard reproductions of Duchamp's entire *oeuvre*. In so far as the art market encapsulates the core features of capitalist production and circulation, not least a relation between private possession, investment, and speculation, Duchamp's *oeuvre* partly subverts the proprietorial distinction between private, public, and communal art. Any public *pissoir* can, after all, manifest as a Duchamp urinal. As can, with variations, any sufficiently old-fashioned private WC at home.

Again, the long history of iconoclasm emerges, not simply in the familiar categorising of Duchamp as an 'iconoclastic artist' but in raising the issue of the modernist *avant-garde* in relation to 'popular' rather than 'elite' 'taste'. In Duchamp's case, irate art-world reaction or gutter-press 'outrage' can easily slip into approving popular laughter. Importing a urinal or a sash window into an Art Gallery, to be solemnly subject to the question '*je ne sais! - Quoi?*', can evoke the Marx Brothers as readily as Karl. Duchamp's 'delay' suggests a serio-comic friction between the restricted world of absurdly super-rich art collectors and outsider bafflement, derision, and often resentment, which summons the ever-prowling spectre of iconoclastic exasperation and repudiation. If not radical replacement.

In 1643 that far less acceptable iconoclast Richard Culmer at least had one inventive idea. Having removed some carvings of saintly figures from the baptismal font situated in the nave, he had the detached sculptures placed in the pulpit as dumb puppets to illustrate and emphasise that the pulpit had been too long silent. It was almost a good joke. Today the steps up to the pulpit are flanked by sculpted and painted figures of a 'succession' of previous archbishops. Normality is restored.

biblia pauperum

So far, this accumulating response to the Royal Window has brought into play, as promised earlier, several clusters or mosaics of comments, each composed mainly of a selection of quotations. These constellations, to misappropriate Benjamin's term, have been concerned first with the theological debates underpinning iconoclasm in the English Reformation, and then the notion of 'Taste' and its relation both to displaced quasi-theological aspects of objections to religious paintings and its contribution to the ideological functions of 'art' after the Civil War. Which took us variously to Hogarth, Morris, Monet, and Duchamp, all of which has also

provided a context for Gostling's *Walk* and Canterbury tourism. Overall, we have also looked at the genealogical series of windows, including Adam in the great west window, and the rearranged south-west transept window. It is time to consider some more windows.

In the ambulatory around the choir, presbytery, and shrine area, there are two series of stained-glass windows, which are normally referred to as the '*biblia pauperum*' windows and the 'miracle' windows. These exemplify two fairly obvious functions, the first offering a concentrated instruction in the basic tenets of the Christian belief system, a kind of theological PowerPoint presentation, a 'Bible for the poor', and the second a visual celebration of Becket's miracles. On occasions when pilgrims queued in line along the northern ambulatory to be given their chance, near the Corona, of seeing and even approaching the shrine itself, there could have been on-the-spot guides with the two-fold task of crowd control and pointing out the significance of the windows which flanked the queue, perhaps even translating the Latin inscriptions on each window, and no doubt rattling a collecting box. For a vivid sense of how this area of the cathedral might have been thronged on a busy day at the height of the Becket cult one might today visit, for example, some of the great Hindu shrines in north-east India on a festive occasion.

True to the tradition, of course, even some present-day guides suggest that a contribution or even a tip might be in order, but the full economic aspect of the second series, the miracle windows, can be left until we consider the Treasury, which is strategically placed just next to them.

Here I want to consider the first series, the *biblia pauperum* or 'theological' windows. There were once twelve such windows but they were almost entirely destroyed by various iconoclasts and what's left is now largely grouped into just two windows. The current arrangement preserves only a few elements of the original complex organisation of all twelve windows taken together. Since they were almost completely destroyed we have to reconstruct, as with the Royal window, what was in them. Gostling ends his account with somebody else's detailed description of some of the remaining windows, and Somner includes in his appendix a version of a manuscript in the archives which lists the pictorial content of each of the panels in the original twelve windows. It was a formidably ambitious scheme and perhaps the largest such stained glass cycle in Western Europe at the time.

The core design feature of each *biblia pauperum* window was that it was originally divided into groups of three images, each trio with an event from the New Testament in the middle panel flanked on either side by images normally drawn from events in the Old Testament. The three images together constitute a horizontal row while the central New Testament images also form a vertical column which represents a sequence of the major events in Christ's life. The theological significance is precisely in this arrangement, rather than in the individual events treated as separate stories. The events in the Old Testament were regarded as 'types', prefiguring,

promising, anticipating, prophesying, what is to occur in the New Testament as the 'anti-type', the fulfilment, realisation, or implementation of the types. What the entire cycle of twelve windows presented were the complex relationships between over a hundred and fifty panels.

I mentioned earlier the way in which the 'instruments of the passion' on the angels' shields above the Christ Church Gate could be seen as connected in multiple ways to each other and could provide a kind of hyper-text arrangement around the central figure of the Pieta, the mourning mother of Jesus, as the focus for emotional meditation. The original set of theological windows in the cathedral constituted a much more ambitious programme, presenting a version of the entire Christian theological schema and an interpretation of world history almost in terms of what we might now see as a kind of parallel processing, not so much a chronological succession of events as a pattern of re-enactment, replication, realisation.

To take an example images of which can easily be found on the net: the higher rows of the first theological window as it now exists. The top centre image shows the three Magi on horseback pointing to and following a prominent star which leads them towards Bethlehem. The left-hand pane has Balaam riding his ass and gesticulating toward the invisible angel which has blocked his way, and thereby alluding to Balaam's prophecy that 'a star shall come out of Jacob and a sceptre will arise out of Israel' (*Numbers* 24:17). The right-hand panel shows the prophet Isaiah, with the inscription 'the Gentiles shall come to your light, and kings to the brightness of your rising' (*Isaiah* 60:3).

The gestures in both side panels point towards the star in the central panel, below which in the next row down is an image of the Magi being told by King Herod to come back later and inform him of the whereabouts of the Christ. This central pane is flanked on the left by the Israelites escaping from Pharaoh, guided by a pillar of cloud and a pillar of fire (*Exodus* 13:21), and on the right by Christ himself leading the Gentiles away from a pagan idol, over which a destroying angel visibly hovers.

The third row central pane then depicts the Magi and shepherds worshipping the Christ child, flanked by the Queen of Sheba offering gifts to King Solomon and by the once-enslaved Joseph in Egypt receiving tribute from his brothers.

The fourth centre image continues the story of the Magi as an angel appears to warn them not to return to Herod, while on the left Lot's wife is turned into a pillar of salt for disregarding the warning 'look not behind you' (*Genesis* 19:17-26) during the destruction of Sodom and Gomorrah, while on the right a complex allusion to the unnamed prophet in Bethel (*3 Kings* 13:1 – 9) brings into play another refusal to obey a divine injunction together with prophecies of both the destruction of King Jeroboam's golden idol and of the birth of a child to the house of King David.

A full explication of the interconnections between these images, and the others which completed the seven row arrangement in the original window,

would have stretched the theological and biblical resources of any onlooker or guide.

Moreover, the choice of which Old Testament types to match up with any particular New Testament anti-type could vary considerably, depending upon the specific theological point being emphasised. For example, the crucifixion could be prefigured by any one or more of the following: Abraham's sacrifice of Isaac, Moses lifting up the serpent, Jacob's prophecy (*Genesis* 49:11) 'he shall wash his robe in wine and his garment in the blood of the grape', Moses striking the rock to release life-giving water, Eve being taken from the sleeping Adam's side, along with such pointed biblical texts as *Psalm* 21:17 'they have pierced my hands and my feet' or Zechariah's 'why are these wounds in the middle of your hand?'. (13:6). And many more.

Thus, the overall arrangement of the typological windows provides not simply an appealing story-book but a pattern more like a logical structure, such as the square of contraries, or the syllogistic format, with major premise and minor premise leading to a logical conclusion. Into such a formulaic template different elements could be inserted as necessary, and the program would process those segments according to their complex schematic relationships and produce an appropriate conclusion, an outcome generated by those elements in that particular relationship. Not unlike the off-the-shelf open source code of some computer applications.

Those splendid coloured windows therefore make their essential doctrinal points with what is almost a pedagogical diagram. And the visual point could also be made orally, as in a well-structured sermon, with the narrative and its argument entertainingly illustrated. An important element in the overall *biblia pauperum* compositions are the brief texts in each panel which concisely identify the particular aspect of the 'type' which is to be echoed in the anti-type and which could also be pointed out and explained as the pilgrims shuffled past.

The general destruction of the windows and the drastic re-organisation means that the arrangement is even more difficult to explain today. So visitors mainly only look at these windows more or less as coloured pictures, or perhaps as separate biblical stories which they might half-recognise. It is the theological connections between them that are now side-lined as we admire their artistry.

The commonly used term *biblia pauperum*, 'the Bible of the poor', is partly misleading, derived from much later printed wood-block versions designed as picture-books aimed at instructing the 'poor' or the illiterate mainly through the pictures themselves. More sophisticated such printed books were however probably intended for a thoroughly literate class of clergy who could not only read the Latin texts but do the work themselves of constructing the multiple inter-connections. Nevertheless, the term is useful as referring a mode of visual organisation and reminds us that such intricate patterning was indeed characteristic of the overall programme of paintings

and stained glass in any mediaeval church, including the now largely vanished wall-paintings which once covered large parts of this cathedral.

Including painted texts: Somner records (1643, p. 396) that still legible on the wall of the north aisle of the choir, at the foot of 'the painted piece there', was a four-line dialogue between a 'heretic' and Saint Anselm concerning the virginal conception of Our Lady, in which Anselm's deploys the traditional image that just as the light of the Sun does not violate glass nor glass that of the Sun so the birth of a child leaves this virgin intact. Each window in the cathedral, including the 'Royal' window could have been 'read' with that argument in mind.

One reason for my earlier preferring the awkward term 'visible species' is to discourage thinking of those wall-paintings and other images in a mediaeval church as primarily 'art works', or representations of stories, or simply as elaborate decoration, but rather as providing an overall theological programme, a set of pedagogical presentations. The mediaeval term 'species' refers in an optical context to a difference between ways of understanding how the visible was seen, whether the eye emitted a kind of illuminating light or received a 'form' projected from the object of attention, an issue we will return to in considering mediaeval science.

One obvious such pedagogical doctrinal image is the depiction of the Last Judgement, often found dominating one end of a church, which we still almost automatically read not simply as an imagined visualisation of heaven and hell but as the impending enactment of an action which assigns different souls to one side or the other of the image, with threateningly immediate implications for ourselves and the eternal consequences for our earthly actions, which are often implicitly or explicitly depicted, especially those which portray the several vivid forms which vice or evil can take. This image is not just a story, past or future, but a demand upon us in the present as we look at it and it looks back.

a device for thinking

I referred to the theological windows as PowerPoint presentations – which is unfair to them, given the devastating critique of PowerPoint by Edward Tufte. The complex arrangement of a *biblia pauperum* window is actually a good example of a mediaeval device for thinking. One can imagine a variety of diagrams or windows using the tripartite division of a row of type and anti-type images. Recall Anselm's argument that England is sustained on one side by the Archbishop and on the other by the King, which is a very different model from the one deployed for example in the frontispiece of the 1539 Great Bible representing King Henry VIII as sustained on one side by the church and on the other by the nobility, with the King in the centre distributing the Bible to both estates.

The cathedral itself might be imaged as sustained from one side by the educational or ideological function of the theological windows and on the

other by the proclaimed capacity to call upon divine as distinct from earthly power, as signalled by the Becket miracles. A powerful Archbishop such as Chichele might be flanked on one side by papal authority and on the other by the wealth of the monastic and cathedral possessions, thus enabling a relatively independent role for Archbishops who found themselves in conflict with the King. Both these props of archiepiscopal power were of course removed in the 1530s with the repudiation of papal allegiance and the dissolution of monasteries, while the structure of a Last Judgement painting is echoed in the frontispiece of Foxe's *Actes,* with old Roman corrupion contrasted with the new Protestant church.

From one perspective, the iconoclastic attacks upon Canterbury in the 1640s were a direct assault not only upon the liturgical policies of Archbishop Laud but upon the very status of Archbishops. The logic developed in more radical circles implied the abolition not just of cathedrals but of bishops, which some saw with alarm as leading inexorably to the abolition of royalty itself. Culmer's decision to leave only the Royal images intact in the transept window signalled either caution or weakness, but in any case the mere smashing of images or windows may have constituted a successful temporary assault on idolatry but was not in itself a powerful political weapon, unless backed as in the 1640s by military power. The characteristic gesture by modern protesters of smashing the plate-glass windows of banks and prominent shops can be as much an indication of strategic impotence as of political anger.

Iconoclasm is sometimes assimilated to Luddism as a form of allegedly mindless resentment and destruction but, just as iconoclasm could have a theological coherence, the smashing of unwelcome machinery might be defensive sabotage, including a selective discrimination between oppressive and productive innovation. In a revolt against factory conditions the target of angry machine-wrecking could be as much the ownership and management organisation as mechanization itself, and the continued hierarchisation of the post-papal Anglican church, with its distinctive concentration of both wealth and ideological hegemony locally symbolised in a bishop's chair, was itself idolatrous for some radicals, an attitude to be later encapsulated in Marx's characterisation of capitalism in terms of commodity fetishism.

In the *Arcades Project* Walter Benjamin offers a comment on a new mode of idol, with a combination of a quotation from Marx and a gloss from Otto Ruhle:

> With the price tag attached, the commodity enters the market. Its material individuality and quality are merely an incentive for buying and selling; for the social evaluation of its value, such quality is completely irrelevant. The commodity has become an abstraction. Once it has escaped the hand of the producer and been stripped of its real particularity, it ceases to be a product and is no longer ruled by human

beings. It has acquired a 'ghostly objectivity' and leads a life of its own. 'At first glance, a commodity appears to be a self-evident, trivial thing. But an analysis shows that it is a perplexing thing, full of metaphysical subtleties and theological quirks.' Detached from human will, it aligns itself in a mysterious hierarchy, develops or refuses exchangeability, and acts according to its own laws, like an actor on a phantom stage. In the language of the commodities exchange, cotton 'soars', copper 'plunges', corn 'is active', coal 'is sluggish', wheat 'pulls ahead', and petroleum 'shows a trend'. Things have gained autonomy, and they take on human behaviour. . . The commodity has been transformed into an idol that, though a product of human hands, lords it over humans. Marx speaks of the fetish character of the commodity. 'This fetish character of the commodity world originates from the peculiar social character of the labour that produces commodities. It is only the particular social relation between people that here assumes, in their eyes, the phantasmagorical form of a relation between things.'

new icons

It may be appropriate here to construct our own imagined window, in order to organise an already over-compressed range of considerations as a further context or constellation for thinking about these windows. If the multiple images in the windows which illuminated Canterbury Cathedral once encapsulated an entire ideological system which shaped mediaeval Europe, a new set of interrelated icons might help us to grasp the configurations of our present period.

Following the *biblia pauperum* model, we could try to visualise an arrangement in several groups of three panes, with connections within and between each group, composed not of theological types and anti-types but indicating complex technological and economic interrelations. The central vertical axis of such a 'window' could be provided by what we can regard as the different dominant communication systems, which seen as sequentially following each other but also as accumulatively incorporating elements from each other. Fully to elaborate the various connections I want to suggest would be as tedious as the explication of a *biblia pauperum* window and an elaborate diagram probably unhelpful, but my imagined schematic window can at least be sketched.

We have already considered in relation to Gervase and Foxe some aspects of the shift from manuscript culture to print culture so let us begin by assigning the central image of the lowest or historically earliest row to a printing press, which could stand for the production of books and pamphlets but also for the enormous printing presses of the mass newspaper period.

Alongside that image I might first place a portrait of William Gostling, as a representative of what Coleridge was later to call the 'clerisy' in his *On The*

Constitution of Church and State, a book partly prompted by concerns regarding the Catholic Emancipation act of 1829. Coleridge argues for a network of educated individuals which would extend throughout the nation to act as a kind of cultural leavening of the uncultivated masses. This was envisaged as almost a direct complement of or substitute for the parochial clergy. Each was to act as the local repository of what Matthew Arnold was to call 'the best that has been thought and written'. Given his preoccupations and his amiably instructive *Walk* Gostling might well be regarded more as a member of such a 'clerisy' rather than as a religious clergyman.

Theological instruction had of course always been a form of 'cultural' dissemination, part of the overall mission of the clergy in sermons and other forms of instruction to convey an overall ideology, the doctrinal messages of Christian belief from Adam to the Apocalypse, clarifying as in the *biblia pauperum* arrangement, and in the liturgical cycle itself, the prophetic pre-figurations of the the main events of the life and death of Jesus: annunciation, nativity, temptations, baptism, preaching, miracles, passion, death, resurrection, ascension, all told again and again to a captive audience, not only as stories from the historical past but precisely as statements about the doctrinal framework of the present.

Moreover, the monasteries in particular had been repositories of what we might now simply call 'culture', including the crucial transmission of Latin texts: Leland scoured monastic libraries not only for specifically theological works. The continuing function of ecclesiastical institutions in providing forms of education might be signalled by recognising that the Canterbury cathedral school can plausibly be traced right back to Archbishop Theodore in the seventh century. The great mediaeval universities partly grew out of the needs of clerical education and were soon dominated by the Dominican and Franciscan Friars. Coleridge's clerisy would have been a secular continuation and transformation of this powerful ideological apparatus.

The itinerant preaching friars who rivalled the parochial clergy and the great monastic orders are almost evoked in Matthew Arnold's alternative version of the 'clerisy' as the 'aliens' : figures somehow dissociated from any specific class allegiance and dedicated to making available 'sweetness and light'. His major tract, partly a response to the extension of the franchise, might be re-titled C*ulture or Anarchy* and can be read as an extended gloss upon the cynical response to the 1832 Reform Act: "we must educate our masters". For Arnold, the distribution technology of 'culture' was to be primarily the printed periodical, which instead of a parish-based clergy could reach into every middle-class household. Arnold, the son of Thomas Arnold of Rugby and himself a dedicated Inspector of Schools, also held out some hope for reform of state educational institutions. The critic F. R. Leavis inherited all these emphases, in his long effort both to make English departments the critical centre of university education and to disseminate his positions through the journal *Scrutiny*. Even now, notions of the critic as

agent of the transmission of a received 'culture' still sustain much of the ideology of the Humanities.

There is a continuity from Matthew Arnold's concept of 'aliens' bringing culture to the 'anarchic' population through to, for example, Arnold Wesker's attempt in the 1960s to set up Centre 42 with the intention of offering the benefits of high culture to the London proletariat. Lunacharsky's Commissariat of the Enlightenment was a Soviet variation upon the basic notion of bringing 'art *to* the people', rather than fostering art of or by the people. In both contexts there was a somewhat ambivalent notion that the 'culture' created by its actual masters would be of benefit to the oppressed. That belief is not too distant from, say, the 1960s attempt by *New Left Review* to transform the intellectual panorama of the UK by a journal and a publishing house. The preferred medium of all these efforts was the printing press.

However, in our imaginary window, flanking the printing press on the other side from Gostling I would place an image of an advertisement, or indeed an actual advert. By the late nineteenth century what was reaching into ordinary households were not earnest pamphlets by William Morris but the mass circulation newspapers in which advertising played a double role: earning income from the advertisers, and offering in their increasingly pervasive content not 'sweetness and light' but insistent inducements to buy commercial products. The printed billboards and posters which had plastered the walls of city streets were now ushered, in their throw-away newspaper form, into each family home and workplace, and daily addressed every seat on the bus or tube. The transformative cultural impact of commercial advertising as a revenue model was to be repeated in the development of so-called 'independent' television channels 'competing' against the UK BBC and displacing the very notion of 'public service broadcasting'. Again the invasion of the previously advert-free Internet in the late 1990s crucially reshaped the global communications network, not as a medium to 'inform, educate, and entertain' (the BBC charter mission) but to sell commodities and indeed to invent and proselytise profitable services we didn't even know we needed.

TV

We could then, moving up the imagined window, put an image of a television set at the centre of our second row, and let it stand for the overall development of the audio-visual technologies which gradually integrated photography, film, recorded music, news reporting, game shows, soap operas, and so on. The television set in every home remorselessly displaced not only printed newspapers but those earlier institutional initiatives for local cultural dissemination which can be tracked in Gostling's *Walk*. It is worth recalling in a somewhat compressed mode what was largely displaced by 'watching the telly'.

My 'extra illustrated' copy of the 1825 edition, with numerous added inserts from contemporary and later cuttings and prints, emphasises the establishment in Canterbury of an array of civic cultural spaces: the Philosophical and Literary Institution, which developed into the Beaney Museum and Art Gallery, and anticipated the first publicly funded Public Library in England to take advantage of the 1845 Museums Act which allowed city corporations effectively to subsidise the reading of books. Add the landscaping of the Dane John Gardens for a civilised stroll around its curious mound, and a theatre or even two, the opening of the first passenger railway station in the world at Canterbury West, to encourage tourists to come to this city of culture, and the recognition of the marketable character of the cathedral itself. These initiatives could be seen partly as attempts to incorporate previously 'improper persons' within the hegemonic reach of 'culture', and we can recognise that by the mid-nineteenth century, with the defeat of Chartism and the avoidance of the 1848 turmoil on the continent, and with an 'Imperial Bonus' or colonial dividend undergirding the slowly rising living standards of ordinary people, the hegemonic class coalition was sufficiently self-assured that steps could even be taken to include within its scope those once-excluded 'dangerous classes'.

It is possible to see not only the cautious and piecemeal extension of the franchise and the development of public education but also the provision of access to previously exclusive cultural privileges as partly assimilative and partly defensive strategies in a new phase of contested power. On the other hand, the development of cities dependent upon cultural tourism and of seaside towns, as occasional holiday resorts or permanent retirement places, often meant that previously peripheral businesses became almost the only economic activities sustaining a town or city. Culture as an economic domain was an ambivalent business.

The Canterbury weaving and the worsted knitting once lauded by Gostling's *Walk* has long vanished, leaving The Old Weavers building on the Kingsbridge as only a pleasantly 'antique' restaurant for lunch as tourists saunter the High Street. What now clusters around the Cathedral itself are souvenir shops offering transient shoppers a range of knick-knacks and 'curious' objects designed solely for the purpose of being bought as mementos of having bought them. Charles Dickens, familiar with the cathedral towns of Rochester and Canterbury and the seaside towns of Broadstairs and Herne Bay, coined the symptomatic name 'The Old Curiosity Shop' but he perhaps did not fully anticipate how an entire city economy might be so characterised. Often without much economic benefit to the local population, most visitors are content with 'window shopping', a characteristic activity of Benjamin's *flaneurs* in the Parisian arcades. No doubt the inhabitants of, say, Florence, Venice, or Prague, have similar reservations about the impact of dedicated tourists, not least upon the 'visible species' of their city.

In Canterbury there are few 'attractions' and after wandering around the cathedral visitors can find themselves at a loss as to what to 'visit' next. There are the ruins of St Augustine's Abbey, the ancient church of St Martin, the mediaeval pilgrims' hostel on the High Street, and a few fragments of Roman pavement and suchlike in a very small Roman Museum. This being post-iconoclast England, they will not find a great deal of Artistic Interest in any of the several churches in the city.

Tourists are rather unlikely to visit the local Museum and Art Gallery, the Beaney Institute, now grandly re-named The Institute of Art and Knowledge. If they do, they find a fairly dismal and rather typical English provincial collection, in which the prize exhibit is, it seems, a large painting of a prize bull, by Canterbury's own Sidney Cooper, regarded as the nineteenth century's finest painter of cattle in the British Isles. The nearest to modernity is a bust by Epstein or a drawing by Sutherland. As it happens, Henry Moore spent several years in his studio near Canterbury but there is hardly a trace of this work in the city. Apart from Sidney Cooper, the other artist prominently celebrated is Mary Tourtel, her work barely known outside the UK and her name hardly recognised within it: she was the artist responsible for Rupert Bear, once a popular children's character. Gostling lists the dozen or so portraits of local worthies and benefactors which once hung in the Guildhall and one gets the impression that the Beaney Gallery is still a throwback to the mediocre collection to be found in any local squire's manor house.

The entire centre can seem given over to retail chains, some local 'quaint' shops, numerous 'gift' shops selling souvenirs to be inflicted upon others, and multiple competing cafes and small restaurants. Yet Canterbury has the highest concentration of University students of any comparable-sized city in Europe, some 40,000 in a population of 150,000. It has a Waterstones bookshop, an Oxfam bookshop, and one antiquarian bookshop. Clearly the notion that 'culture' might be disseminated by local initiatives and civic institutions was optimistic.

dramatised society

For the panel on the other side of the television set I would inscribe a text, a paragraph from a 1974 lecture by Raymond Williams, *Drama in a Dramatised Society*:

> We have never as a society acted so much or watched so many others acting . . for the first time a majority of the population has regular and constant access to drama, beyond occasion or season . . drama, in quite new ways, is built into the rhythms of everyday life. On television alone it is normal for viewers, the substantial majority of the population, to see anything up to three hours of drama, of course drama of several different kinds, a day. And not just one day; almost every day. This is

> part of what I mean by a dramatised society . . What we now have is drama as habitual experience: more in a week, in many cases, than most human beings would previously have seen in a lifetime . . To watch simulated action, of several recurrent kinds, not just occasionally but regularly, for longer than eating and for up to half as long as work or sleep; this, in our kind of society, as majority behaviour, is indeed a new form and pressure.

There are two reasons for including this passage. On a very broad scale, at the very origins of public theatre one might argue that a 5th century Greek *demos* watching a play did so in an arena congruent in obvious ways with the kind of assembly space in which that same audience took 'political' decisions for the briefly democratic *polis* of which they were members. A mediaeval catholic dramaturgy might be cosmic in its scope but resolves itself into the dramatisation of decisions over one's own eternal future, a matter on which each individual is in a position to respond (at least until a theology of election and predestination prevails). In metropolitan Elizabethan drama, there could often have been a fairly direct continuity between the disposition of ranks of power within the auditorium and within the play: the opening of *Coriolanus* sufficiently indicates the theatrical possibilities. English Restoration and French neo-classical drama are predominantly directed at the kinds of audience most likely to encounter precisely those entanglements of power and desire, in the marriage market or court intrigue, which are the main subjects of those socially claustrophobic dramas. Equally, bourgeois drama of all kinds tends to focus upon those issues which a bourgeois audience has within its own control: the issues dramatised are often offered at the precisely appropriate scale of, rather than 'reduced to', the apparently 'personal' dimensions, of change of heart or sentimental sympathy. Ibsen's characters, for example, often come not from a politically nondescript or insignificant middle class but largely from the locally ruling business and professional class. George Bernard Shaw was undoubtedly right, commercially as well as politically, to postpone the opening London night of his *John Bull's Other Island* till after the Parliamentary recess!

In other words, there was in the dramatic and literary forms up to the twentieth century some consonance between the prevalent media, its modes of address, and the actual power of the collective or even individual addressee, while the written text or theatrical performance was often directed at a specifiable audience about specifiable issues in relation to which that audience had some presumed capacity to intervene and act.

Thus, theatrical naturalism as a dramatic form characteristically offered a set of rooms as the stage setting, and thereby tended to restrict its range of concerns and actions to those which can in some sense be represented as occurring within a room, whether domestic living quarters, business office, or political back room, a fairly precise setting for the kinds of control and

power which the dominant audience for that form would indeed have been able to exercise. Though the characters might look out wistfully or apprehensively through a window towards some desirable distant landscape or threatening historical event. Film would eventually open that window onto a panoramic screen of adventurous action often way outside the likely experience and the potential leverage for intervention of the cinematic audience.

However, if one tries to correlate size of readership or audience with the degree of power exercised by any individual reader or spectator, or the kinds of domain over which they have some autonomous control, then the wider the readership or the more extensive the audience the more restricted is likely to be the actual or acknowledged power of any average member of it. Which is clearly the case with television. For there is now a palpable strain when one watches, say, a television drama or documentary concerned with contemporary politics, where one's sense as an ordinary viewer of any direct capacity to intervene in the issues examined may be very weak indeed. Even more so, the repeated experience of watching The News, with its vivid daily reportings on bombings, famine, war, high-level summits, NATO conferences, ministerial meetings, across a global horizon, while unable as a spectator to immediately translate any of those problems into direct engagement, can lead to a general structure of feeling in which watching the news becomes a ritualised exercise in fatalism or the suspension of any active attention.

It can then seem that we are fissured between being able, with an extraordinary and historically unique privilege of access, to watch not just dramatised 'representations' but real-time processes and actual events unfolding on a world-historical scale, yet at precisely the same time know ourselves to have remarkably limited power or leverage to influence the issues presented to us. That gap between knowledge and power becomes part of our habitual response. Watching such dramatic events unfold on a television screen in the domestic living room reinforces one's sense not of engagement but of exclusion, as we turn from the reporting of some outrageous event (the bombing of Libya, Chernobyl, Sudan famine, Gaza) and register how little we can personally intervene. We are only spectators watching a screen. Which might as well be showing a fictional version of the world, and often does.

Moreover, the received 'democratic' modes of political access, mediation and engagement are also dominantly presented, and present themselves, as continuous with that distanced world of power represented as elsewhere, rather than (necessarily?) as within the areas of immediate intervention open to the domesticated observer. A major problem remains deeply unresolved of the relations between 'representation' (in both senses), forms of 'public' discourse, and the actual areas of effective control available to those who constitute the audiences for that discourse. Even after organised mass campaigns successfully extended the formal franchise, that reliance sketched

earlier on 'culture' as a hegemonising bonding within a restricted elite was transmuted into a more subtle instrument for maintaining power and dominance.

From being an inward constitutive of a new ruling class self-consciousness and sensibility, a modified version of 'culture', sometimes characterised as 'popular culture', was increasingly offered, in the mass newspapers of the nineteenth century and the mass media of the twentieth, either as an external and so-called 'national heritage', dangled discriminatingly before an 'uncultured' subordinate class but with the promise of incorporation and assimilation, or as a domain of blithely a-political entertainment and commercialised enjoyment, a realm perhaps of fantasy identification or magical satisfaction.

The underlying result was effectively to separate potentially increasing knowledge from actually diminishing power, to offer an unprecedented dramatising of society more or less freely available to all citizens, manufacturing an imagined community across a national breakfast table or television couch, yet at the same time to restrict any actual engagement in political decision-making to an occasional intervention in the private election booth.

The second reason for including that brief quotation from Williams is that though the passage doesn't mention advertising, the colonisation of television by adverts, as Williams well knew, increasingly constituted a pervasive quasi-dramatic genre within the spectacularised representation of the world we were supposed to be living in, almost at the risk of regular resentment at its inescapable intrusion before, in-between, and after, every program, a medley of mini-dramas mingled with micro-second trailers for insistently upcoming programmes, all financed by the demand that we buy the products advertised, including payment for the subscription channel itself. The nineteenth-century newspaper model of finance had transmigrated, along with such figures as Rupert Murdoch, and we no longer window-shop only in the High Street. We watch shopping channels on TV.

Much more could be said about television and advertising, that endless menu of 'curiosities', the odd, the anomalous, the amusing, the entertaining, including other people's travel experiences and largely interchangeable presenters' casual saunters through fragmentary displays of history, art, and culture, compressed into a fleeting forty minutes or so, yet carefully allowing time within each programmed hour for advertising slots designed to arouse our more commercially profitable curiosity. Successful advertising has often been at the cutting edge of visual design and media technology – indeed the crucial cultural role of advertising had already been anticipated by that major modernist text of 1922, *Ulysses*, in which Leopold Bloom earns his insecure income by soliciting adverts for a newspaper.

Over the century or so since, the pervasiveness of advertisements, entrenched in newspapers, television broadcasts, and public spaces, meant

that we were unremittingly immersed in a variety of enticing virtual objects. We are continually subjected to persuasions to buy the objects depicted, and thereby indirectly to pay for the further penetration of our whole environment by this inescapable invasion, and even when we have no intention or desire to make an actual purchase, our mental, visual, and aural experience is continually filled with imagined objects, and even complete scenarios, which saturate our sense of what constitutes the world we live in.

These miscellaneous yet constantly repeated, uncoordinated yet consistently cross-supporting, advertising messages, episodes, and tableaux constitute an insistent and almost inescapably pervasive articulation of a single compelling message, fragmentarily infiltrated into our imagination: that the desirable world is fundamentally constituted by purchasable commodities, and that there is always an alluring alternative to our actual current reality, one which is enticingly only a credit card away from realisation.

As if, suitably updated and modernised, an entire panoply of *biblia pauperum* windows now surrounds us everywhere, not just shop windows but the scrolling smartphone. It is not individual advertisements, any more than the single story of the present-bearing Magi, but an entire system which is sustained by its magic promises.

Each advert presents itself as an already half-familiar glimpse of a permanently attractive other reality, another world accessible through a receptive response which almost instantly constructs an entire alternate dimension, constantly yet elusively present in our mundane perception of the actual world around us: billboards, advertising hoardings, printed posters, scrolling electronic displays, broadcasting interruptions and interleavings, website pop-ups and self-starting videos, strident sponsorship slogans or demurely located brand logos. This permeation of our conscious and unconscious by the lures of advertising seems no longer even directed towards any actual purchases, but pervasively enacts a collusive celebration of the commodity form itself, presented in a self-reflecting circularity as the image of itself. A new idolatry with its rituals and priesthood, ardent believers and passive followers.

Though we will not, and indeed cannot, purchase all the myriad objects, activities, services and experiences which so enticingly invite us, we are nevertheless recruited into a vicarious enjoyment and routine acquiescence in this overwhelming provision of imagined satisfactions, despite knowing that in our actual experience such promises are permanently postponed or remain personally unreachable. It is like living inside a vast commercial cathedral dedicated to the worship and celebration of the commodity, and one we can barely envisage being able to exit. And yet: there is an inbuilt flaw, a limit or contradiction in this whole system of commodity advertising.

There is vastly too much to buy and too little income for most of us to buy everything we are induced to want. What is at root a crisis of unstable

over-production and under-consumption takes shape as a permanent frustration, a daily resentment, and finally perhaps resistance as an habitual iconoclasm of attention whereby we ignore the object being peddled even while we succumb to the blandishment of the advert. We learn to appreciate, enjoy, be amused by a superbly accomplished or knowingly clever advertisement strategy while erasing any conscious trace of what in particular was being advertised. It was time for a new hegemonic strategy and technology.

digital windows

If we now move to the next row upwards in our imagined window, the central panel will undoubtedly be occupied by the image of a personal computer, in one of several rapidly developed varieties from the 1970s onwards. In the emergence of the personal computer a familiar ambition, similar to the clerisy model, albeit now in a profit-seeking commercial mode, was clearly at work in Bill Gates' proclaimed wish to have a computer installed in every home. In the later drive of internet providers to expand the on-line population to the entire globe there was a reprise of the Coleridgean ambition to have a member of the clerisy present in every locality, or Arnold's earlier confidence in the capacity of print periodicals to enter every household.

For a while, the dissemination of the personal computer, and in particular the globally interlinked web, could optimistically be regarded as the most recent stage in a quest at the heart of a certain tradition within the humanities: to Inform, Educate, Entertain. The BBC, after all, not only established the Open University but developed what was arguably the most successful UK personal computer, the BBC Micro, devised primarily for educational use and part of an impressive computer literacy campaign. In the USA Apple lobbied to equip every school with its products, not least for the attached tax breaks which crucially financed its early rapid expansion. The apples were 'free' but the inescapable temptation was to be trapped for ever by the exclusive brand.

When I was able, in my own chosen time, to download whole archives of Tibetan music, or galleries of aboriginal art, or masses of documentation on native American cultural practices, or whatever else might happen to interest me, there was a genuine sense in which the basis for a shared global culture was being formed on my and every other desktop. Obviously however, much of the material now to be found on the net is not what Arnold would have recognized as issuing forth sweetness and light, and commercially oriented services and products have colonised and saturated the net. One effective cause was again advertising. But in a new modulation.

At first, computers could be safely assimilated to that restrictive tradition of specialist skills and arcane knowledges, in continuity with established

guilds of scribes and clerics. Mastery of a programming language or fluency with a command line interface required a learning curve akin to that of beginning to read or write, but while schools increasingly despaired of teaching even basic book-skills a generation of juvenile hackers and teenage games-masters exposed as doubly hollow the specious political promise that conscientious orthodox computer literacy would ensure profitable employment. The rapid de-skilling of all computer-assisted competences, so that almost everyone could now not only use word-processing software or an accounts program but almost paint, compose music, CAD-engineer a ground plan, or administer a virtual Simcity, coupled with the internet dissemination of newly public information channels beyond the control and constraint of formal educational structures, left the previously privileged inheritors of print peculiarly sidelined.

The replacement of the radio and television set by the computer with its own kind of interface and crucially its capacity for two-way communication, both download and upload, also took over some of the functions of the phone network and indeed the net was built upon it, 'a global bricolage, lashing together unthinkable complexities of miscellaneous computers with temporary lengths of phone-line and fibre-optic, bits of the ethernet cable and strings of code', as I once described it in a *NYT* review. My father, a telephone engineer, used to explain that when you made an international phone-call you were activating the largest machine on the planet. The first successful national digital network, the French publicly owned Minitel system, began largely as a replacement for the increasingly bloated printed telephone directory and developed into a messaging, banking, and shopping service throughout France.

The computer, as the frontier scouts of cyberspace proclaimed, was carrying us all into a new era, of liberated information, electronic gift-exchange, artificially intelligent agencies, pollution-free nano-technology, artificial life forms, and global community, with the home computer as hub of a potential re-invigoration of the public broadcasting remit of not just entertaining but instructing and informing, as a carrier of news and reference, and with the development of apparently comprehensive search engines the provision of access to global libraries of text, image, sound. There was no longer much of a distinction between local, national, and global access, except for non-technical reasons and political excuses.

As the digital revolution replaced even the phase of 'prosumer' production, of affordable sophisticated AV equipment enabling almost anybody to make their own videos and music compositions, what became almost conceivable was a version of William Morris's notion that much of our work might actually become enjoyable, even a form of art-work, since anybody could learn the requisite skills (or software) to creatively produce text, images, music, video, with unprecedented individual access to instant global distribution. Computerised small-batch production and affordable 3-

D printing would even allow a new variation on the arts and crafts movement. Do-it-yourself had gone digital.

The overlap between advanced computer research and immediate applications in the leisure and entertainment fields posed questions about the relation between popular and elite cultures: was learning the Amiga game-design program *Amos* an advanced educational activity or a street hobby? Brecht's account in *Galileo* of the dockyard mechanic instructing the philosopher in new methods of calculation might also be recalled. Involved in these technical possibilities was potentially a real transformation, it seemed, on a par with those associated with the invention of print. The early proliferation of computer networks, bulletin boards, electronic mail facilities, raised again the possibility of innovative public spheres, of non-territorial equal-access communication communities in quite new forms. Were we living through, in Eadmer's term, a historical-cultural *mutation*? Well, at least a new dominant communications system.

Or perhaps just the technology and social relations of a barely modified industrial-capitalist period reaching its always-inevitable apogee of unparalleled global disparities, and the 1990s optimism was merely the passing fag-end of a brief century deceived yet again by its own utopian hype and hypocrisies? Until the late 1990s, the Internet was determinedly free of advertising but, particularly after the dot-com bubble, the web was rapidly transformed into a global network profoundly shaped by commercial intervention and private ownership, with advertising crucially taking new forms, direct, oblique, covert, and eventually even more pervasive and intrusive through personalised data-harvesting. The traditional models of newspaper and television advertising which had visibly inserted an advert or a commercial break was however vulnerable on the computer to a simple ad-block program. That had of course to be circumvented.

canary warning

So what images should flank this central image of the computer? On one side I could have a photograph of the Canary Wharf development, on the other a selection of logos from the so-called 'tech giants', Google, Facebook, Amazon, with perhaps slightly faded trademarks of Microsoft and Apple. Though I could hardly resist having the Windows TM mark itself.

Canary Wharf and its soaring skyscrapers (those perhaps increasingly obsolescent physical office spaces) prompted the writer on architecture Martin Pawley in his *Theory and Design in the Second Machine Age* to suggest that the enormous spans of stained glass in Canterbury, Chartres, St Denis, the great Gothic cathedrals with their vast window spaces packed with informational content, were the precursors of the twenty-first century's glass skyscrapers designed to accommodate enormous flows of data and

electronic signalling, so that the expanses of stained glass in mediaeval cathedrals almost prefigured the screen-based information systems of our present conjuncture.

He argued that the extraordinary architecture of these corporate headquarters of banks and financial moguls was designed mainly to incorporate immense amounts of electric cabling, just as the function of Gothic stone was primarily to hold up immense expanses of glass, slender skeletons of stone for framing a Gothic information system. Though in the case of the modern data-hungry commercial world the architectural implications were to some extent cloaked, since the visible glass acres of skyscraper walls were actually subsidiary to the design problem of having to build into the very fabric of the building the enormous cabling and cooling apparatus to sustain ever expanding computer power, architectural requirements which created the peculiar ratios between skyscraper floors and the intermediate spaces between them, carrying the crucial conduits, while the actual office spaces were given unnecessary floor-to-ceiling plate-glass windows to disguise that invisible feature. In that respect the Canary Wharf windows are a kind of spectacular distraction. After all, a supercomputer churning out algorithmic calculations at quantum speed hardly requires daylight.

Now attend to the other flanking panel: those well-known high-tech logos. An average desktop or laptop machine was once a miniaturised cabinet of your own preferred software, including productive processes and personal hobbies or curiosities, and provided a minuscule multi-media cathedral in which to work and play, one maintained not by a monastic order but by its twentieth-century equivalents. The Benedictine, Cistercian and Carthusian Orders were enormous and wealthy international corporations and their equivalents for a while were the competing gargantuan companies, IBM, Microsoft, Apple, Intel. The upstarts Google and Facebook, with a panoply of minor orders such as Skype, Zoom, Twitter, were equally dedicated to the cut-throat expansion of their own Order, but also collectively committed to sustaining a new dominant system, not – obviously – for the benefit of the poor, or to disseminate culture, but to increase the power and profits of each organisation on a transnational and multigenerational basis. Perhaps the Franciscans were distantly revived in the hacker communities and free 'open source' software engineers.

As the Reformation had recognised, the stupendous wealth of the monastic orders ultimately derived from large numbers of people paying monks to do something they could have done for themselves: to pray. The Reformers also insisted that ordinary people could even read the Scriptures for themselves and perhaps celebrate a liturgy without a hierarchical mediator.

Almost conversely, the wealth of the new corporate tech orders was initially based upon selling us digital versions of professional skills we could

all now learn for ourselves, displacing the typist, secretary, accountant, travel agent, booking clerk, and so on, and redefining established processes in the office, the factory, construction industry, haulage business, retail trade, and even the computer sector itself, as the graphical user interface replaced the monochrome command line. By clicking on a simple icon we could individually, it seemed, take back control from all those expensive intermediaries, and by learning a new Windows program or simply opening a new window on a screen we could extend and improve our range of capabilities and our marketable skills, gradually implementing the collective dissolution of long rigidified working practices and superannuated work hierarchies.

However, later 'improvements' in effect clawed back central forms of control, with regular encyclicals of compulsory updates stemming from the Vaticans of Seattle and Silicon Valley, which increasingly meant that we no longer had access to stand-alone programs installed on our own personal machine but were permanently dependent upon a cloud-located limited licensing. Meanwhile Apple's pioneering removal of the optical drive eradicated any remaining personal library of CD-ROMs and DVDs, following vynil and cassette into discarded history, displaced by always-online streaming and subscription contracts.

What was initially a bye-product of these developments, the tracking of traces of each user's actual mundane activity, was transformed into the harvesting of personal data to constitute a profile which micro-defines us for the purposes of selling us yet more commodities. Increasingly, we can no longer exploit computer technologies in order to re-make our own work as we might wish, as a digital-savvy William Morris or the Free Software Foundation might have hopefully anticipated, but instead the intensive exploitation of digital technology is based upon our own unpaid work, contributing on a constant basis to the accumulation of far from surplus data. Marx's distinction between 'use-value' and 'exchange-value' has been joined by a third term: the 'user-value' generated each time we activate an icon. Ad-blocker, cookie-cleaner, privacy legislation, are not effective against this mode of intrusion and the core economic function of advertising in sustaining the current dominant communications system remains intact, but now with a further double displacement.

The user data itself only has value as a commodity to be sold, through whatever intermediary ad-agencies, to a company which actually makes products or services profitable enough to be worth the expense of advertising and personal data harvesting. Perhaps 80 to 90 percent of the income of a Google or Facebook (whatever they are now called) rests upon both selling advertising to users and selling user data to advertisers, but here a loop emerges which is even more visible in the case of an Amazon.

The Web initially encouraged individual retailers and businesses to set up their own websites to attract customers, sometimes under the aegis of collective associations for particular products, the classic pioneer sector

being the bookselling trade, with the ABE (Advanced Book Exchange) site launched online in 1996. Amazon adopted the basic model and eventually gobbled up ABE in 2008, but also expanded the template to provide an increasingly comprehensive over-site, as it were, for any retail product or retailer, with that site itself, as with Google Search, effectively acting as a form of primary advertising. But then, why sell data to other companies to enable them to use your own site to advertise and sell their wares when that information could enable Amazon itself to market products known to be desirable from their own user data, including consumer preferences, feedback, and purchasing records. Indeed why not, either directly or indirectly, through takeovers or otherwise, simply manufacture or provide all such goods, branded as convenient with one's own logo or not. An online global shop window could perhaps be transmuted into a one-way mirror or even a *mise-en-abime*. A dizzying prospect of a global retail monopoly perhaps beckoned.

post-smart-phone

We have reached the top row of our imagined modernised cathedral window where, as the upper gothic arch curves over, there is perhaps only room for one image. It would currently be the screen of a smartphone. An arrangement of icons strikingly similar to that of the the stained glass windows we have been considering Recall the teenager sauntering down the aisle of the nave and responding to a text message or taking a photo on his or her mobile phone. But the smart phone can now do so much more. A smartphone now enables through the activation of its icons an extraordinary range of activities.

It even remains a phone to be used in traditional oral mode, but can also send written text, thumb-typed or dictated emails, text-messages, tweets, video clips. The printed newspaper has gone online, to be swiftly swiped into visibility if not readability, along with other news services and channels. The printed book has been falteringly replaced by the e-book, the library by a search engine trawling online encyclopaedias and offering downloadable texts of every kind. Film and theatre can be captured in high-definition clips and a vast repertoire of recorded music streamed at the wave of an iconic wand. The smartphone has partly replaced our relation to civic services, accessing local and national websites or being put on hold by remote call centres. Increasingly, other territories of social activity are assimilated into the smartphone repertoire: boarding cards at airports, booking confirmations at theatres and concerts, digital passport or driving licence verification, and has itself become in effect an ID card, with your medical records during a pandemic proving your vaccination or testing. The smart-phone has become a payment system, a sophisticated credit card, and your immediately accessible bank account. It can monitor your fitness and health as well as providing an alarm clock, calendar, diary, a personal

assistant. The smartphone is itself a camera for taking photos and videos and for accessing and viewing them. You can buy or window shop, play games or gamble, watch sport or porn, access television and radio, incorporating those previous technological moments into this new hand-held technology. A city of bits in one's hand. A portable toolkit. And, crucially, it accompanies you, everywhere, all the time. Transmitting data.

Television had already anticipated much of the convergence of these facilities of sight, sound, and text, film and newspaper and music. Once a small house-hold shrine in a corner of the living room, now a wall-sized electronic window. Internet access on a desktop or laptop had extended the range. But portability in a pocket or handbag, instant access, what Heidegger would no doubt have called ready-to-hand-ness, changes and intensifies our instant relationship to this electronic tool-kit. The majority of people now have their phone with them 24/7, as the devout used to carry prayer books, miraculous medallions, or rosary beads. Like always having your personal guardian angel, amulet, or genie with you, a *shabti* continuously ready to undertake services for you in a virtual world.

Everything is now doubly displaced, first into the invisible code of the digital domain and then revived as a visual presence in a new Flatland only a few millimetres in depth. A dedicated user devoutly performs the requisite rituals, consults or prays each morning and into the small hours, regularly checking their social media presence, a constant examination of conscience by a paranoid neo-puritan, an anxious self-assessment of one's credit rating or wider street cred. A hand-held window which vastly out-performs the eighteenth-century eye-glass, the variable telescope, grandfather's spectacles, or the Lorraine-glass. A glass through which we see even in the dark.

But 'window' or even Windows is now an obsolete image. Icon is more apposite. The great iconoclastic controversy of eighth-century Byzantium revolved, in part, around different theologies of the image. The Western defence condoned pictorial representation against the accusations of impiously making the divine visibile, of dangerous incipient idolatry. The seventeenth-century English debate reprised that argument. But a more subtle Eastern theology regarded the icon not as a picture illicitly permitting us to depict or see the forbidden divine, or even as a semi-transparent veil allowing a glimpse of the beyond, but as itself an active extrusion of divine power, an intrusion or extension into our world: the eyes of a claasic Orthodox Greek icon look at us. A gaze of surveillance and assessment. An expression of power directed at the gazer. Possibly a transmission of grace, a beneficent glitter of golden light, even an annunciation. In any case, a judgement.

The icon on a smart screen is not simply the visible end of a global leverage which our casual touch can choose to activate or access on our behalf. It is the eye of a largely untouchable power continually observing us. Each of us carrying our individual tribute to its apparent indispensability, its control is more over us rather than our control over it.

But a new iconoclasm would be difficult to initiate. Like burning the landscape we live in? A strike against or boycott of the largest machine on the planet is difficult to organise or even envisage when we are individually both unpaid worker and insatiable consumer, each carrying and cherishing our own little hostage of our selves. Simply smashing this inseparable window seems to be not an option, any more than the perhaps not entirely fatuous proposal of the grimly comic terrorists in the film *Four Lions*: "Let's blow up the Internet!"

*

Yet each of the panels of our imagined alternative *biblia pauperum* window which have led to this apex could have been different, as a consideration of the various actual and alternative possible connections between them would illustrate. We can at least ask what might, if there were space and time, flank this current central image in the final row. What might come next? What could succeed the present dominant constellation? We will later for example consider 'AI' in the perhaps unexpected context of Saint Anselm.

The use of painted or stained glass in some respects prefigured much later technological inventions and interventions. As differently coloured stains or pigments variously block or modulate the passage of light through the glass they can transform the daylight into readable information, as a range of visible colours. It was to be several centuries before we recognised how the interruption or manipulation of waves in other spans of the electro-magnetic spectrum could be harnessed for the communication of, for example, binary information units. Clearly, our current understanding – or only partial understanding – of visible light as electro-magnetic has tended to erode some traditional metaphors. It is rather more problematic now to speak of an 'inner light' or even of a period of 'enlightenment'.

But in the long term, perhaps even measured by the time it takes to build a cathedral, we need reconsiderations and indeed reformations of two crucial domains or disciplines, one convergence of which is currently encapsulated in the smartphone: the two realms of scientific innovation and global economics.

Next to the 'miracle' windows was the Treasury. Immediately beneath the north west transept's Royal window is the tomb of John Pecham, a thirteenth-century specialist in optical science and an advocate of ecclesiastical poverty. Next to him is the tomb of Archbishop Warham, friend and patron of Erasmus and the last Catholic archbishop before the Henrican Reformation which, after all, had by then unexpectedly and extraordinarily quickly removed from the landscape those once apparently unchallengeable vast monuments of wealth, power and ideology, the great monasteries, one of which had built this still magnificent Canterbury Cathedral. And had suddenly been astonishingly expelled from it.

I therefore propose to meander around a bit more, with some further half-thoughts, concerning Pecham's science, monastic economics, the music of the choir, and, in this age of emergent artificial intelligence, to consider the very process of thinking about thinking, prompted by the now more or less empty chapel of Saint Anselm.

*

John Pecham

When I show visitors around the cathedral, as we leave the nave we usually pause on the steps leading up to the choir, to look at the two great windows in the opposite transepts. They then probably expect me to take them either up the steps into the choir, and so to the main altar and beyond that to where Becket's shrine used to be, or alternatively into the north-west transept to what is now called the Martyrdom, the spot where Becket was killed. I normally do take them into the north-west transept, but not to the martyrdom site itself. Partly because I don't want to have to tell the story of Becket, yet again, but mainly because one of my favourite tomb memorials is in a corner of that transept.

The martyrdom area is normally crowded with people, mainly looking at the sword sculpture hanging grimly over the spot which commemorates Becket's murder. I instead take my visitors over to a not very noticeable tomb in the far corner, which is that of Archbishop John Pecham, or Peckham, who died in 1292. We have probably just been talking about the windows, art and iconoclasm, and earlier in the nave about history and time, topics which engage most people. But who was Pecham and why should we attend to him?

Well, one reason why Pecham's tomb is worth noticing is that the full-length dormant effigy is made of beautifully worn wood, dark ebony, 'bog oak', probably the oldest material in the entire cathedral apart from the stones themselves. The episcopal mitre on the reclining figure, which presumably was made of rather more obviously valuable material, has long disappeared, so the head looks peculiar with a sort of hole in it. Pecham's effigy is among the relatively few wooden sculptures to have survived in England, more or less intact, from the later Middle Ages, a rare object

which has somehow outlasted several destructive waves of iconoclasm. Its ancient wood takes us beyond human history, while Pecham's own work takes us even further back

I like to suppose that the choice of wood, rather than ostentatious marble or other expensive material, was Pecham's own decision. Because another reason for celebrating him is that he was the only Franciscan Friar ever to be made Archbishop of Canterbury. Pecham had a reputation for austerity and for the extreme simplicity of his personal needs. He travelled across Europe to a meeting in Padua on foot rather than transgress a Franciscan rule forbidding friars from riding even a donkey. He wrote several tracts arguing that the Franciscans should maintain their original dedication to poverty. It's an obvious irony that the church authorities made him the archbishop of one of the richest dioceses in Europe. That Friar Pecham is buried near that most lucrative source of ecclesiastical income, the Becket martyrdom, is a vivid instance of several conflicting aspects of mediaeval Christian institutions. I like to speculate that Pecham also chose to be buried next to the door into the monastic cloister because he was planning an escape from his unwelcome and onerous appointment as Archbishop.

Another plausible motive for Pecham to have chosen this particular spot for his tomb is that its rear wall abuts onto what was once a small working library or storehouse for books in the cloister, since Pecham was most decidedly a scholar rather than an administrator. He wrote a considerable number of works, across a range of topics, including biblical commentaries and philosophical and theological treatises. He composed at least one major liturgical Office, for the feast of the Trinity, and several poems, one of which, *Philemon*, was to be a source for a famous poem by Lydgate about a nightingale.

Nevertheless, when appointed Archbishop in 1279 at the age of sixty-seven Pecham proved to be a formidable administrator. He is credited with transforming the finances of the monastic houses in his province and he made numerous episcopal visitations throughout much of England and Wales. His determined efforts to ensure that the clergy provided regular and systematic education in the teachings of the church meant that his outline of what should be taught remained the foundation for such instruction well into the later period: his *Exornatorium curatorum* was still being printed in 1519, though attributed sometimes to others.

Pecham, like most late mediaeval archbishops, was also involved in national politics, even taking active responsibility for a military campaign in Wales, and he played a highly disreputable role in the expulsion of the Jews in 1290. More creditably, he was committed to constitutional reform of the church itself, and was also instrumental in preserving and organising the first surviving detailed registers for the cathedral after his predecessor, Archbishop Robert Kilwardby, took many of the cathedral records with him to Rome in 1278.

Before he left, Kilwardby had also pre-sold the monastery's grain harvest for 1278-9 and since the crops of 1279 had also been sown while the see still had no appointed Archbishop the profit belonged to the King under the *sede vacante* conventions. As the incoming archbishop, Pecham therefore had to borrow enormous sums, not least from Jewish money-lenders, but on his death he nevertheless left the Canterbury Christ Church estate with a respectable surplus of £5,305.

His life before becoming Archbishop can be briefly summarised. He was born in Sussex around 1230, educated at Lewes Priory and became a Franciscan about 1250. He studied and taught at the University of Paris till about 1271, returning to England to teach at Oxford 1272-77, was attached to the Papal curia around 1277, made Archbishop in 1279, and died in 1292. There is a biography by Decima Douie concerned mainly with his administrative career,

Naturally, I spare my visitors most of this detail and just offer some bare dates. You are getting the deluxe version. I then pause and ask if anyone wears glasses or contact lenses, or has a camera. The answer is almost always yes. These days, most people carry a camera, if only on a mobile phone. I then suggest that they pay homage to one of the people whose work arguably helped to invent spectacles and, eventually, cameras. And they duly take a photograph. As for those with glasses or contact lenses I point out that Pecham wrote what was once a highly reputable book on optics, entitled *Perspectiva*, which was used as a university textbook for several centuries. At this point some lose interest and go and look at the hanging sword.

I want however to consider Pecham not as an Archbishop but especially as a 'scientist' and also as a 'philosopher'. But there isn't much point in so labelling him unless we have some sense of what those terms meant in the thirteenth century. Which means engaging with some probably unfamiliar ways of thinking. At least you can console yourself that you aren't sitting in a cold and windy cloister to read a handwritten manuscript or listening to a lecture in Latin. And you can always just turn a few pages and skip to the Treasury instead, if you think economics is more compelling.

I first consider two of Pecham's philosophy texts, on creation and eternity, and later look at his work on optics and eyesight. These might seem somewhat disparate topics, but by thinking about them together, and then looking at some other figures associated with the cathedral, I will also rather indirectly explore what is often regarded as a somehow endemic 'clash' between 'science' and 'religion', a topic which unfortunately sometimes seems to be as old as bog oak.

eternity & creation

The first text by Pecham which interests me is normally referred to as *Questions concerning the Eternity of the World*. You can't get much further back

in history than that, I suppose, though Pecham's approach does not concern what we normally think of 'history'. Pecham's treatise was translated by Vincent Potter S.J. under that title in 1993, based on an edition by Ignatius Brady in 1974. There was also a version of the Latin text, edited by Omar Argerami, in 1961 but now difficult to find. It's an early work and may even have been part of Pecham's *viva* or oral examination for his Paris doctorate. This took the form of an elaborate debate in which the candidate had to adjudicate for two days on arguments between several scholars and students and on the third day defend a 'thesis' against objections from his colleagues and pupils. What we have may be more a record of this actual exchange than a systematically composed text.

I mainly use my own translation, inevitably indebted to Potter's, but the problems lie not in translating the fairly lucid text but in making sense of the points argued.

Only two *quaestiones* or discussions survive. Not only was there an elaborate ritual governing the organisation of the debate but scholastic discussion was generally obliged to follow strict procedures. This took the form of first presenting objections or arguments against a position, then proposing arguments in favour of it, and finally suggesting a resolution of the issue, with brief concluding refutations offered of each of the previous arguments one was rejecting. In an oral disputation this would have involved each participant outlining a sequence of arguments to which the other participant would have had to reply in detail. The written form retains marks of this procedure in the standard formulae which organise the presentation.

Pecham begins by stating the first 'question' and then outlining some objections:

> The question is : whether anything has been or could have been made out of nothing successively.

It will probably be a surprise that the first 'contra' argument cited by Pecham is the following:

> It is shown: that the answer is negative. Because, as Jerome witnesses, 'Although God can do all things, still He cannot make a corrupted woman a virgin.'

Pecham then comments:

> But the affinity of being to being is greater than the affinity of non-being to being. If, therefore, God cannot make a virgin out of a corrupted woman successively, still less can He make being out of non-being.

This seems a somewhat bizarre approach to the issue! The strange reference to Jerome might have been included simply because somebody in the audience at the doctoral viva had raised it and the disputant was obliged to answer any and every argument thrown at him, since the whole exercise was a kind of competitive intellectual chess-match. It was also incumbent upon the candidate to show that, in the words of the standard requirements for modern doctoral dissertations, he had 'read all the relevant literature'. Which is one reason why so much of a 'Scholastic' dispute is taken up with quotations from 'authorities', not because those authorities are unchallenged – the very format requires that they are – but in order to show that the disputant is aware of the positions adopted by others. The procedure is a kind of formalisation of Aristotle's way of arguing, by first surveying and criticising previous opinions on a topic. As Aristotle had remarked in the opening of *Metaphysics* Book α:

> No one is able to hit on the truth adequately, though no one misses it completely. Each says something more or less correct about the nature of things, and though each by himself may contribute little or nothing to the truth, all together contribute much. (993a31-b4)

Yet how is this quotation from Jerome at all relevant to the issue of creation from nothing? Pecham's gloss elliptically indicates why.

It was sometimes argued that not even God could do the impossible and Jerome's restored 'fallen virgin' was a standard example. The implication here is that creation from nothing is even more impossible and is thus deployed to counter the case that God could do everything, including the impossible. The relevant issue was whether God could change the past, including a situation in which there was no past, since if in the past there had been nothing at all and God created something then he had in effect changed the past, which is impossible. The overall argument can still appear in modern discussions about the nature of time, as for example in Michael Dummett's 1964 essay 'Bringing about the past' (*Philosophical Review*, 73, 338–359). But I have no intention of trying to show that I have read 'all the relevant literature': to take account of the enormous bibliography on the topic of time and eternity is well beyond the scope of this brief account of Pecham.

Like playing chess, Pecham proceeds with the next few moves and counter-moves, using the standard formulae (which I have italicised) for how to respond:

> *To this it was answered :* that the woman's fall passes into history and since the same thing cannot be both past and not past, therefore a virgin cannot be made out of a corrupted woman.

To the contrary : in like manner the *non-esse* [non-being] of a creature passes into history, and so for the same reason *esse* [being] cannot follow upon it.
Furthermore : there is a greater affinity between Creator and creature than between non-being and creature because between Creator and creature there is an analogy of being. But God cannot make a creature out of the Creator, since the Creator is immutable while the creature is subject to change. Still less, therefore, can being be made out of nothing since being has no affinity at all to it.
*Again***,** if being can be made out of non-being, then since the distance from non-being to being is infinite, an infinite distance can be traversed. But this is false, since, according to the Philosopher: 'An infinite expanse cannot be traversed either by a finite or by an infinite being.'
Further, if one has power over the infinite distance mentioned above, then for the same reason one would have power over any other distance. One would, therefore, have power over the distance between Creator and creature since the one infinite distance is greater than the other.

To put it mildly, these rapid shifting moves and highly compressed statements and counter-arguments obviously rest upon a whole range of assumptions or premises which are not fully stated and which might seem bizarre to us, but which, in an actual debate, could either have been taken as agreed by the disputants or subjected to further discrimination and argumentation. For modern readers this opening set of moves seems almost miscellaneous, however concisely expressed, and almost irrelevant to how we might tackle the question posed. So I quote this passage mainly to illustrate how we might find thirteenth-century Scholastic arguments remote or simply incomprehensible, but also as an instance of the rapid intellectual footwork which the overall Scholastic methods encouraged.

However, if we move to the sixth 'objection' in this 'quaestio', we might more easily recognise at least the kind of argument which is being deployed, once the opening premise is allowed. Italics again highlight the accumulating stages and overall structure of the dialectical exchange and also indicate some quasi-technical terms:

Again: every *actio* is by contact, *either* by bodily contact, as in the case of physical things, *or* by virtual contact, as in the case of spiritual beings.
If, therefore, God produces what was created through His virtual contact, then *either* what was created exists before it is touched (I use 'before' here in its natural meaning) *or else* it is touched before it exists.
If according to the first alternative, what already exists is not caused by what comes after, then the creature is not caused by divine virtual contact.

If, however, it is touched before it exists, one can argue to the contrary: every verb, according to the grammarians, includes in its meaning '*esse*' and adds something to it. Whence it follows: 'it touches' means 'it *is* touching,' and 'it is touched' means '*it is*' plus 'touched.'
If, therefore, the simple is prior to the composite, and if what is added on to another is posterior, then 'to be' is prior to 'to be touched' and so on as above: *esse* itself, then, is not created by divine virtual contact.

It would be relatively easy to reformulate this set of moves in more idiomatic and more modern terms, as an argument about the meaning of the words involved, since clearly Pecham is offering a kind of 'scissors' argument, in such a way that the sets of unfolding alternatives are seen to be equally problematic.

The next objection includes a variation on this pincer device:

Further, if we suppose a creature began to be, let us take the instant in which it began to be, and call it A.
Again, suppose that at a prior time the creature had no-being, then let us take some instant in which it was not, and call it B.
Between A and B, then, since they are related as 'before' and 'later,' there was time.
If you should say : that this 'before' was the now of eternity,
then, to the contrary, it is argued : it follows, therefore, that the beginning of time was after eternity or the now of eternity.
But this is false, since the now of eternity embraces all time: *therefore, etc.*

The concise rapidity of the moves is striking, and demanding. In an actual oral exchange the full implications of these swift turns of argument had to be registered by the opposing disputant, so the conclusion doesn't even need to be explicitly stated. It would have been incumbent upon an interlocutor or opponent in a formal debate to remember exactly and reply explicitly to each step in the counter-argument, and then those counter-moves would themselves have to be responded to in detail by the opposing debater – accepted, refuted, or reformulated, in such a way as to escape the intellectual trap being laid. It's a pretty formidable procedure for a oral exam! Almost like playing multiple but simultaneous chess games with the same opponent and anticipating which of his moves will lead to a check-mate in seven moves on one or other of the chessboards.

Consider one more example, an even briefer scissors argument:

If we suppose that something is brought from non-being into being, 'educed' from non-being into being, this happens *either* when that something is *or* when it is not. If it is educed when it is, then what already is does not need to be educed. What does not need to be

educed, is not educed. Consequently, when something [already] is, it is not created.

You might challenge yourself to work out what rapidly formulated intervention or riposte you would yourself have made in responding, on your feet, in front of a critical audience, to the fresh series of almost dramatised objections and partial responses which follows:

Again, if a creature receives being, *or if* something becomes a creator from being a non-creator, this comes about through a change in the creating agency itself.
Proof: it does not come about through a change in the creature since God creates before the creature is created. For creation is God's eternal *actio*.
In reply it is said : that creation connotes its effect.
*But to the contrar*y : creation connotes nothing except what is said of the creating agent. It connotes *actio*, therefore, and not *passio*. But there is no actio without a terminus. The creature, therefore, is prior to actio.
Furthermore, creation is twofold: creation as actio and creation as passio. But creation as passio is an accident in what is created.
But no accident is prior to its subject.
It is impossible, therefore, for creation as passio to precede what is created.
But what is created could not exist unless creation as passio preceded it in the order of nature, since the latter is the road to the former. A road., however, comes before its destination; *therefore, etc.*

To vary the comparison, following this sequence in the lecture-room might have felt like watching a mathematician rapidly scribbling complex interrelated equations on the blackboard – except that thirteenth-century lecturers did not have the advantage of a blackboard. But the affinity with mathematical and logical chains of reasoning is clear, especially if we cannot follow them.

As before, the final move is left to be deduced without being spelt out. Several of the terms deployed in this argument are obviously quasi-technical, such as *actio, passio, accident, form*, and *matter*, and the whole exchange might be regarded as an intriguing but perhaps tedious example of what later generations often dismissed as merely sterile 'Scholastic' disputation.

no-thing

Yet it is worth now asking how you might yourself even begin to formulate the *question* being debated – whether something can be created out of nothing – and what kinds of arguments for or against such a motion might be offered. To put the problem in more modern terms, the question of

whether there was anything 'before' the 'big bang' has exercised – and baffled – some of the more eminent cosmologists of our own period, as for example Roger Penrose in his *Cycles Of Time* (2010). Indeed, on what basis does one even propose a precise definition of the question?

One of the counter-arguments in favour of the thesis that the universe was created out of 'nothing' ends with a succinct twist of a move which, however deliberately paradoxical, might still give us pause today:

> Further, if 'matter' is that by which each thing can be or not be, as the Philosopher says, then 'matter' is closely related to non-esse [not-being]. If, therefore, if it is 'form' that can be made and if form gives esse, still more can 'matter' be regarded as the principle of non-esse. But matter is not made out of matter, since this would lead to an infinite regress; consequently it is made out of nothing.

Obviously, a modern scientist would not readily accept the word of 'the Philosopher' (the usual honorific term for Aristotle) but I can recall asking an eminent particle physicist from CERN what 'matter' or 'energy' is or is made out of, only to be answered: 'Don't ask.' Richard Feynman at one point in his 1963 *Lectures on Physics* (volume 1, 4-1) remarked:

> Energy has a large number of different forms, and there is a formula for each one. These are: gravitational energy, kinetic energy, heat energy, elastic energy, electrical energy, chemical energy, radiant energy, nuclear energy, mass energy. If we total up the formulas for each of these contributions, it will not change except for energy going in and out. It is important to realise that in physics today, we have no knowledge of what energy *is*. We do not have a picture that energy comes in little blobs of a definite amount. It is not that way. However, there are formulas for calculating some numerical quantity and when we add it all together gives . . . always the same number. It is an abstract thing in that it does not tell us the mechanism or the reasons for the various formulas.

As for 'dark matter', let alone 'dark energy', we could say that at the moment we know almost nothing – except, maybe, that 'it' 'exists'. Does it help much to reformulate Pecham's question as 'when and how did energy come to be?'

On some standard accounts of the 'big bang', the entire universe was so compressed that something like a huge cosmic explosion occurred, out of which came all the energy and matter which now comprises the whole universe. On the principle of the conservation of energy, as currently understood, the cosmos as a whole must therefore have 'already' been 'present' at the big bang. For this to be possible, we might instead argue that almost all of the present universe is in any case comprised of 'nothing'. After all, most physics text-books still emphasise that the 'mass' of the

nucleus of an atom is almost infinitesimal compared with the size of the atom. Feynman again (2-3):

> An atom has a diameter of about 10^{-8} centimetres. The nucleus has a diameter of about 10^{-13} centimetres. If we had an atom and wished to see the nucleus, we would have to magnify it until the whole atom was the size of a large room, and then the nucleus would be a bare speck which you can just make out with the eye, but very nearly all the weight of the atom is in that infinitesimal nucleus.

Pecham was not, however, asking about what we now think of as the 'big bang'. After all, that notion only came into currency in the 1930s when a sufficiently powerful telescope enabled a technically innovative astronomer, Edwin Hubble, to take photographs of the cosmos which apparently demonstrated that the universe was expanding, and therefore that all galaxies (still itself a somewhat novel notion in the 1920s) were moving away from each other. The argument that galaxies had once been ever closer to each other was first proposed by the Belgian Catholic priest Georges Lemaître in 1927, even before Hubble made his measurements, with the implication that, if the overall expansion was reversed, there must have been a point and time at which the whole universe was incredibly compressed – what Lemaître had termed the 'primaeval atom'. A powerful alternative view was still being offered in the 1950s, that in fact the universe was continually being created 'from nothing', in the form of elementary particles randomly popping into existence. This was the 'steady-state' theory proposed by the somewhat maverick Fred Hoyle, variations of which sometimes appear in current theories of quantum fluctuations spontaneously producing elementary particles.

Obviously, Pecham's work is not a contribution to this kind of debate but it does raise some related considerations. Indeed, the position Pecham himself finally arrives at is of less interest than the mode of arguing which his texts exemplify. It is nevertheless worth giving the opening of his own *responsio*, the point where he states his position in relation to the several contending arguments he has surveyed. The response begins:

> Creation is an article of faith and never became completely clear to any unbeliever. And so, some posited a world not produced at all by God, as Augustine says in *De civitate* XI, ch. 4, arguing against them: 'The fact that the parts of the world, whether in motion or at rest, tend to one and the same thing proclaims that the entire world has one and the same source.' Others were even more mistaken, in that they held this world to have been made out of God's own substance, since they could not understand that something is made out of nothing.

Pecham's position is that, without the biblical revelation that 'God' did indeed create the world, various philosophical positions might be adopted: for example, that God didn't make the world at all, or that the world is a kind of platonic emanation of God. He goes on to elaborate the orthodox Christian belief over several pages and then returns to the opening debate in order to offer his refutations of the positions he disagrees with.

However, Pecham himself has surely not made it 'completely clear' how one can 'understand' that something, still less everything, is made out of nothing. What would it mean to claim to 'understand' or make 'completely clear' the notion of the universe having a beginning? I suspect that any extended door-step encounter with an ardent evangelical creationist might still rehearse some of the issues raised by Pecham, if not with his philosophical concision.

But the 'questions' Pecham is examining are not the ones we would probably now ask, such as: *how* did the universe come out of nothing? What Pecham asks is: whether anything has been or *could* have been made out of nothing 'successively'. This is both a question about a possible agency (who or what could make something out of nothing) and about what is possible for 'anything' (to be made out of nothing). Ordinary change, in Aristotle's physics, requires that what is changed has the 'potential' to be so changed but creation is not an ordinary change, indeed not a 'change' at all since 'before' the universe there was nothing to change or to have the capacity to change.

So the question as posed is primarily a question about 'God': 'could God have created the world from nothing rather than from something' – which is closer to the second question in his surviving treatise, which we will look at shortly, about the eternity of the universe and matter. The word 'successively' (*ordinaliter*) also raises the question of time: if the being of the universe occurs 'after' the non-being of the universe, is this a 'temporal' succession – but what does that mean?

Pecham's arguments in *Quaestio I* make use not only of the notion that God exists but also of specific terms which derive from a particular concept of God. Notice that the structure of his argument does *not* take the form: 'the world was created out of nothing, and since only God could have done so, therefore that is a proof that God exists'. But the underlying structure is rather: 'God exists, and since God has the power to create out of nothing, therefore he could create the universe out of nothing, so the universe could have been created out of nothing'. But God might not have so created it, leaving open the possibility that the universe might never have existed. In other words, that the world exists is a contingent fact, not a necessary fact.

Which in Pecham's schema means that for the world to 'exist' is for it to be 'dependent' upon God: that it is contingent means that its creation is not primarily a matter of 'when' it was created but that it is continually being 'created' in its being continually dependent upon God sustaining it in existence – a position compatible, as it happens, with Fred Hoyle's

alternative theory. Indeed, on one interpretation of historical past time as no longer existing, the present time is always being created from nothing.

Pecham's approach might be regarded as a somewhat topsy-turvy way of arguing his case. But one implication of such an argument could be that (as indeed Augustine sometimes implied) 'God' is the cause not just of the contingent universe but of everything within the universe, a position with somewhat peculiar implications for both determinism and free will. A later Archbishop of Canterbury, Thomas Bradwardine, did indeed argue in a thousand-page treatise entitled *De Causa Dei* that God is logically responsible even for evil – but for the moment we can leave Bradwardine out of the argument .

world and eternity

I'm afraid we haven't finished. The second 'question' discussed by Pecham was:

> Whether the world could have been made from eternity.

Note that Pecham is again asking about a possibility ('could'), not a question of fact (was). He presents an opening position:

> It is shown that the answer is affirmative.

His first few moves concern the various authorities to be deployed supporting the affirmative, which I will ignore. But he then offers some characteristically compressed and contending arguments 'on both sides of the question', as we say, a dialogue between positions, taking different sides. The opening move is:

> Once a sufficient cause is posited, so are its effects. But God is the sole and sufficient cause of the world. But this cause was eternal; so, therefore, is what was created.
> *The reply* to this argument was: that it does not apply in the case of a cause acting voluntarily because its effect is according to the manner of its willing.
> *To the contrary :* it follows, then, that if He had willed to have produced the world from eternity, He could have done so.
> *In reply* it may be said that this is true to the extent that it depends on the agent.
> *To the contrary :* God, to the extent that it is up to Him, can do nothing except what is really possible, since 'to be able' implies a relation to an object of a potentiality. Insofar as God is concerned, therefore, if He could produce the world from eternity, the world could have been made from eternity.

Further : God is equally able to produce something finite as something infinite. But He indeed produced something infinite from eternity, namely, His Son. Hence He could also therefore have produced something finite from eternity.

As if this rapid sequence of oscillating arguments, switching between for and against, were not enough, Pecham then offers a set of multiple scissors which might at least strike a modern reader as operating in a rather more recognisable philosophical mode:

Again, the world did not begin to be; therefore it was from eternity.
Proof of the first part: if the world began to be, it did so either in time or in an instant. It did not begin in time because between being and non-being there is no middle ground. Hence it began in an instant. But this is impossible; consequently, it did not begin. Its impossibility is proved thus: the explanation of the world's beginning is the same as that of its ending. But if the world were to cease, it would not cease in an instant.
Proof : because, if the world were to turn into nothing-ness, it would not exist in the moment of its annihilation, and the annihilation of the world would be the terminus of its *esse*. But then the measuring of annihilation would be simultaneous with the annihilation itself, just as the measuring of all motions is simultaneous with motion and of change with change.
Hence, if annihilation is in an instant, the instant is simultaneous with the annihilation. But annihilation comes after the world's *esse*, and therefore, so does the instant which is its measure. So, if the world is annihilated in an instant, that instant is after the world's esse.
But this is impossible, since there can be no part without the whole, and no accident without a subject; *therefore, etc.*
It was replied that annihilation is in the now of eternity. Whatever is in the now of eternity is eternal. But such an annihilation, supposing that it happened, would not be eternal; *therefore, etc.*

Elements in this argument might remind one of the alleged response of the man stopped by the police for drunk-driving: that he was not guilty 'now' of drunk driving since he was no longer driving 'now'. On the other hand, what is also anticipated are issues about measurement at an instant, the core concept of the calculus.

Pecham's arguments continue for several more pages. Thankfully, some are very neatly compressed:

Further, if the world was made in an instant, such a production is impossible, since an instant links two time intervals, and so there would be time before time.

And:

> Further, if the world began in some instant, say in A, then before A the world was not. But the 'before A', when the world was not, let us call B. But between A and B, there is a middle ground because they are not simultaneous, and so there was time. Hence, before the world was, there was time [which is self-contradictory].

When he moves to support his own position he presents the following multi-pronged argument, which is trying to refute the position that the world is eternal. Here he seems to appeal to an argument proposed by Roger Bacon in his *Opus Maius* which regarded time as a line divided into segments, which in some respects both refers back to Aristotle and anticipates arguments concerning the 'number line' deployed much later by both Cantor and Dedekind. It may therefore help to regard the following as implicitly appealing to a 'time-line'.

> *Further*, if the world will have lasted and will continue to last through an infinite time, then let us take an instant in the middle of the day, say A. Let us call the entire time-gone-by 'past-A' and the entire time-to-come 'future-A.' In like manner, let us pick some other instant in the middle of the day, say B. Let us call the entire time-gone-by 'past-B' and the entire time-to-come 'future-B.' Over and above these suppositions, let us also assume that whichever of two equals is greater than some other one is also greater than the other, and that by however much one is greater, by that much the other one is greater. *Further,* let us suppose that whichever supplements the other with something extra added is either greater than it or is a whole relative to it. *Moreover*, let us suppose that two infinities that proceed from the same indivisible point are equal.
>
> *It then follows* : past-A and future-A are equal since, if, *per impossibile*, one is superimposed on the other, the one would neither exceed nor be exceeded by the other. In like manner, past-B and future-B are equal. But past-B is greater than past-A and is a whole relative to it [since past-B includes past-A]. Hence it is greater than future-A. But past-B and future-B are equal; future-B, therefore, is greater than future-A ; but future-A is a whole relative to future-B. Consequently, the part is greater than its whole on the supposition that time had no beginning [which is paradoxical].

I suggest that by the end of two days or so of this kind of exchange you would not have wanted to be a student, let alone the external examiner, at the University of Paris Philosophy Department in the thirteenth century.

According to one account, however, the formidable Dominican Thomas Aquinas was persuaded by some students to intervene in the argument after

Pecham's *viva* performance and Aquinas later published an account of his own position on the eternity of the world, under the title *De aeternitatae mundi contra murmurantes*, which we can perhaps murmur about later.

quaestio

However, I'm not finally concerned with the specific arguments or conclusions that Pecham offers, though it may be useful to outline some more of the context. The introduction to the edition by Vincent Potter S.J. of the *Questions Concerning the Eternity of the World* provides a succinct summary of the immediate context of at least the second question (his italics):

> The Latin Averroists, as radical or integral Aristotelians, held that *it can be demonstrated* that *the world had no beginning* and will have no end. The Franciscans adopted the *contrary* position to the Averroists: namely, that it *can be demonstrated that the world had a beginning* (and perhaps also an end). The Dominicans adopted the *contradictory* position to the Averroists: namely, that it *cannot be demonstrated* that the world had no beginning. They also contradicted the Franciscans in that they denied that one could demonstrate that the world had a beginning.

Potter clarifies the logic or rules of the exercise:

> *Contrary* positions cannot simultaneously be true but they may simultaneously be false. Hence it is possible that both the Averroists and the Franciscans were wrong. *Contradictory* positions can be neither simultaneously true, nor simultaneously false. If one is true, the other is false. Hence if the Dominican position is right, both the Averroists and the Franciscans are indeed mistaken (but, of course, for different reasons). Thomas Aquinas held that neither the 'eternity' nor the 'non-eternity' of the world is demonstrable by reason alone. Thomas was convinced that faith required Christians to hold that in fact the world is not eternal, but this comes solely from faith and not from reason. It cannot be demonstrated from reason either that the world is from eternity or that the world had a beginning. To deny either does not entail a *contradiction*. Hence each is at least logically possible. Only God can tell us which of these alternatives He freely chose for creation.

It is possible these days simply to download the texts of Aquinas and even those of Siger of Brabant (the alleged Averroist) and they all follow the basic organisation of contending arguments and counter-arguments which Pecham's text exemplifies. It was allegedly Pecham himself who introduced into Oxford University a new variation of this procedural

structure, known as a *quaestio quodlibet*, which designated a debate or disputation focused upon whatever topic participants proposed rather than one necessarily announced in advance.

I recall watching, in the 1960s, two Dominicans from Blackfriars, still the Dominican House of Studies in Oxford, putting on a demonstration of such a formal disputation, by engaging in an extemporised debate which observed all the elaborate rules concerning which moves were legitimate, including the need to keep in mind and then systematically refute all the points which one's opponent had made. The Irish writer Flann O'Brien has a wonderfully entertaining parody of such multi-pronged Scholastic exchanges in his 1939 novel *At Swim-Two-Birds*

The 'quaestio' format was not just a distant precursor of Oxford Union debating rules, but exemplified a certain mode of conducting a 'scientific' argument. Notoriously, Scholastic philosophers have been represented as wasting their time debating such an allegedly fatuous question as how many angels can dance on the point of a pin. But perhaps one should think of that 'question' as the fiendish topic for a full virtuoso demonstration disputation!

The implicit intellectual discipline of such highly structured debate is formidable, whatever the 'question'. I was taught in a Catholic school where the biblical scholar Thomas Worden was once scheduled to give a series of one-hour classes on the biblical evidence for the notion of 'seven sacraments'. But he uncharacteristically began by somehow wasting the first half-hour of the first lecture. The second half of that first class was then devoted to a detailed demolition of the alleged biblical evidence often adduced for the sacrament of baptism. Which meant that by the time the bell rang at the end of the period Tom had effectively destroyed in the minds of his earnest Catholic pupils any belief in the scriptural basis for baptism. A week later, he calmly resumed his unfinished first lecture by offering a countervailing case suggesting some possible biblical support for baptism – but then, still evidently out of synch with the timetable, devoted the second half of that lecture to undermining any biblical argument in favour of the next sacrament, that of confession. And so it continued for the seven weekly lectures assigned to the course, each time leaving the assembled negative arguments stretching our teenage minds for a week while we somewhat anxiously waited to see if there was indeed a counter-case to be made. It was an admirable, if deliberately risky, pedagogical technique. It would probably be called intellectual abuse these days. But it taught us to think.

You might now recall a scene in Bertolt Brecht's play *Galileo*:

> *The Little Monk now at the apparatus:* The new Pope will be an enlightened man.

Galileo: So now we start on our observation of these spots on the sun, which interest us, at our own risk and without counting too much on the protection of a new Pope.
Andrea interrupting: But with full confidence in dispersing the star-shadows of Signor Fabricius and the sun-vapours of Prague and Paris, and of proving the rotation of the sun.
Galileo: With *some* confidence in proving the rotation of the sun. My intention is not to prove that hitherto I have been right; but to discover whether I am right. I say: abandon all hope, you who enter the realm of observation. Perhaps they are clouds, perhaps they are spots, but before we assume that they are spots, which would be most opportune for us, let us rather assume that they are fishes' tails. Yes, we will question everything, everything once again. And we shall advance not in seven-league boots, but at a snail's pace. And what we find today we shall strike out from the record tomorrow, and only write it in again when we have once more discovered it. And what we wish to find, if we do find it, we shall regard with especial distrust. So we shall start our observations of the sun with the inexorable determination to prove that the earth *stands still.* Only when we are defeated, utterly and hopelessly defeated, and are licking our wounds in the most miserable dejection, shall we begin to ask ourselves whether we may be right after all and perhaps the earth does move! (*With a wink.)* And if every conception but this one goes up in smoke, then there can be no more mercy for those who have not searched and yet speak. Take the cloth off the telescope and turn it to the sun.
He sets up the brass reflector.

This attitude and procedure became formalised within the development of science as the 'falsifiability' thesis, but it had long been practised as a strict 'Scholastic' philosophical procedure.

three texts

Let us now consider a larger context. The late mediaeval *quaestio disputata* mode of formal argument can be regarded as developing from the relationship between three profoundly influential texts. The first and most important text was the bible itself, read as the basis for prayer and meditation, including the daily recitation of the Psalms and the passages read out during mass as the liturgical texts of the day. In a monastic or university setting the Bible was also intensively read and studied in the context of a great deal of accompanying textual apparatus. What was called the *glossa ordinaria* comprised the complete text of the Bible arranged so that on each page there was only a small segment of the biblical text itself, which was entirely surrounded by a selection of relevantly applicable quotations from the early Fathers of the church and other commentators, so that

different versions of the 'senses' of the text – the literal reference, the allegorical application, the moral significance, and so on – of that particular passage in the bible could be easily consulted and memorised. The sheer size and complexity of this arrangement of the whole bible later constituted a formidable challenge to the early printer-publishers, resulting in several huge folio volumes. In addition, each 'master' theologian would have offered both oral and written 'commentaries' on individual books of the Bible, thereby increasing the enormous corpus of material devoted to understanding and responding to the text of the Bible.

The second widely influential text after the glossed Bible was the *Sententiae*, or *Book of Sentences* of Peter Lombard, a more or less systematically organised treatment of the range of the church's teaching, arranged in 'questions', each of them comprising a summary of the biblical and other support for the church's position on each question and including refutations of arguments against those positions. It became an essential part of the training of all professional theologians that they should undertake to provide a commentary upon Lombard's *Sentences* in their probationary years of lecturing. Which meant that, though there was thus a shared range of reference, a common 'text-book', each commentator, each trainee theologian, was expected to be able to offer their own individual and well-argued gloss upon Lombard's 'questions'. University theology students were expected to have followed at least two sets of lectures on the *Sentences* by different lectures. This could include memorising or copying the formidable array of commentary and counter-posed arguments. Lombard's *Sentences* are mainly organised as a commentary upon topics raised by the biblical texts, but arranged systematically rather than in the order of the Bible itself.

Alongside the *Biblia glossa* and the *Sententiae* in some monastic libraries and increasingly in any university setting, would have been a somewhat less officially endorsed text, by Peter Abelard, known by the title '*sic et non*' – simply the Latin for 'yes and no', or 'thus and not so'. Abelard's text consists entirely of a considerable range of 'propositions' to do with various matters of belief, but each is glossed, or accompanied by, one or several quotations from the Bible or from some recognised authority to support that proposition but – crucially – then by a matching but contrary assemblage of similar quotations opposing that same proposition.

Now put these three texts together. In effect, the oral form of disputation deployed the resources of the *glossa ordinaria* in the mode of Abelard's *sic et non*, pitting one biblical text, traditional authority, or argument, against another within an overall systematised structure partly derived from the organisation of Lombard's *Sententiae*.

Moreover, a further stimulus for intensive debate was exploring differences between the relatively few texts traditionally known of Plato's work and those increasingly available from Aristotle's wide ranging *oeuvre*, prompting a tendency towards taking up comprehensively contrary positions derived from one or other of these two major philosophical

influences. For example, the leading Franciscan theologian Bonaventure, largely following the influence of Augustine, adopted a fundamentally Platonic philosophical approach while the Dominicans, with prominent figures such as Albert the Great and Aquinas, developed an allegiance to Aristotelian approaches.

Underpinning some shared criteria for the kinds of argument which were allowed as legitimate was, by the thirteenth century, the newly re-translated logical treatises of Aristotle, including the *Prior Analytics* and the *Posterior Analytics* which formed a substantial part of the basic training in logic in the universities and upon which many of the major teachers of the day also offered detailed pedagogical commentaries. Robert Kilwardby, later an archbishop of Canterbury, was one of the first to provide such a detailed commentary on Aristotelian logic.

What was constructed by this combination of texts and procedures was, in effect, a machine for systematic thinking. Of course, as with any computing apparatus or algorithm a great deal depends upon what constitutes the input. And also what programming language you prefer, or is available to you. One impact of the new influx of texts, authorities, and arguments, was a fairly rapid paradigm-shift, at least in university circles, away from the essentially polysemic and hyper-textual or inter-woven character of such collective or composite texts as the *glossa*, the *sic et non*, and the *sentences* – and indeed the multi-stranded Bible itself – towards a much more individualised notion not so much of 'authority' as of author-ship (not least that attributed to 'Aristotle' himself), including a professional and sometimes possessive claim to personal innovation and invention, and a model of intellectual production favouring the composition of intellectual systems produced by individual major figures.

The later mediaeval mode of disputation thus explicitly acknowledged and was indeed methodologically based upon a degree of recognised inconsistency or incompatibility between authorities, between authorities and reason, between reasons and reasons. But how were these contests to be resolved? In itself, a form of dialogue or dialectic, an argument with others and with oneself, might establish only a more or less temporary consensus or agreement, even while aspiring to something more apodictic or demonstrable. There was an increasing problem of what would count as a permanent or stable resolution of difficult intellectual issues, with an emphasis upon epistemological problems – what it meant to 'know' or 'understand' in the first place.

One of the familiar problems was even agreeing on what the 'question' is, how it is to be formulated, and the very terms to be used. Later mediaeval scholastics were particularly preoccupied with the precise definition of the words in any dispute: for example, what exactly is meant by 'nothing' or 'eternity'? In the Aristotelian corpus for example several quite distinct senses of the apparently most basic term 'being' could be differentiated. Which sense of 'being' applied to which kind of entity? Or which senses of

'time'? The increasingly refined vocabulary included distinctions between several times: temporal, aeviternal, sempiternal, eternal. Which kind of time do angels enjoy? What kind of time was Adam living before he became mortal?

My main point here is that the kind of 'scientific' issues which shape the 'question' today of the beginning of the universe are askew to the way the mediaeval debate was directed and resolved. It was not philosophically or theologically important to Aquinas *when* the 'beginning', or big bang, occurred, whether 6,000 or 13 billion years ago, or if a 'beginning' *never* occurred. A 'big bang' made no difference to the issue of how far the universe has to be regarded as contingent and therefore, on Aquinas's view, dependent for its very existence upon 'what we call God'. The shifting views of today's current scientific thinking as to the 'age' of the universe make no difference to the issue of whether the universe was or is created if the core concept of 'creation' has to do with dependence rather than chronology, continuing contingency not primal 'beginning'.

Pecham's treatise nevertheless considered the two different but related questions: whether the universe was made out of nothing, and whether it had no beginning. His own position is offered: he argues that it is possible to prove that time must have had a beginning, that the time of the universe cannot be eternal or a-temporal. He was here opposing the position of those who argued, deploying very similar procedures of disputation, that it was possible to prove that time cannot have had a beginning. This issue was not to be settled by any appeal to data about when such a beginning might or might not have occurred, but rather whether the concept of 'when' could even apply to any such beginning.

Aquinas took a third position: that it was not possible to prove either position concerning a beginning but it was possible to resolve the issue by an appeal to authority, the authority of the Bible – but that too was part of a much larger context of argument as to what the relationship between philosophical argument and the authority of the biblical text might be.

As for the first question, whether creation could be from nothing, Aquinas concurred with Pecham, that God had no need of prior existing material in order to create the world. Aquinas appeals in the end to a biblical text (*Genesis*) not as a way of resolving the philosophical issue (still less any scientific inquiry) but as deciding what is the case 'in fact' – since he regarded one 'sense', the 'literal sense', of the biblical revelation as stating facts, including a truth about the beginning of the world, though this was only one of several 'senses' or meanings and *Genesis* was also concerned with quite other issues such as the problem of evil.

Aquinas's procedure is, one might claim, what cosmologists do now. The decisive resolution of questions about the 'big bang' or 'singularity' is by appealing to 'the facts', if we can satisfactorily establish what the 'facts' are, and even if we cannot explain or even understand those facts. Which was also the attitude of Galileo's inquisitors. Galileo was not officially

condemned for teaching that the Earth went round the sun. He was explicitly at liberty to teach that view but only as a 'hypothesis' to be debated, an interpretation of the (astronomical) facts which was pedagogically plausible and practically useful. But he was censured and imprisoned for denying the truth of Scripture, the 'facts' about the Sun which the revealed Bible attested. The issue was not whether the Sun went round the world but whether the text of the Bible said it did.

The notion of an 'hypothesis' was what both Isaac Newton and the 'Copenhagen School' later declined to offer in their respective domains, choosing to take the experimental observations and mathematical calculations which describe or encapsulate those observations as the 'facts' but to offer no hypotheses as to why those facts might be the case. When Newton said that 'I make no hypotheses' he was disclaiming any attempt to offer an explanation of 'gravity'. Though when Laplace later said 'I have no need of that hypothesis' he was quite differently referring to any appeal to 'God' as a causal explanation.

In one sense, Pecham was not exploring questions about the cosmos but about God or the concept of God, since his 'question' was whether God could create out of nothing and how the concept of God relates to the concept of time. Which is one reason why his discussion begins with that curious quotation from Jerome.

What was often at stake in the thirteenth-century disputes was whether a received theological position was philosophically or conceptually coherent or not. One might argue that Christian believers tried to combine two incompatible conceptual notions: those derived from particular philosophical frameworks and those inherited from ancient texts recounting certain folk fables or national traditions. There might indeed be a continuing belief in a benevolent father of the tribe, attributed with cosmic status as the father of us all, who figures as a vivid character in various long-transmitted and revered tribal narratives. But such a belief is not the same as or necessarily compatible with the notion that such a figure is also to be identified as the 'prime mover' derived from a philosophical argument. Appeals to local beliefs have been followed in various ways, including not only the notion that the Israelites are the chosen people of a divinity who was transmuted into the creator of all mankind, but also in the notion that the local planet on which we happen to live is somehow special and that its status is different from that of all other parts of the universe. One might equally ask whether the very concept of a beginning, or of a fundamental 'cause', is itself coherent, non-contradictory, and the same kind of issue also arguably underpins the problem of reconciling different modern scientific theories.

A post-mediaeval updated version of the *Sic et Non* could be periodically composed of successive irreconcilables: is Newtonian mechanics compatible with Einsteinian relativity, can quantum mechanics be reconciled with gravity, in what sense is light both particle and wave. Some

of the most basic equations appealed to in different periods might themselves be seen as inducing self-contradictory conclusions, or at least as incorporating potentially incoherent usages: the difference between the formulation of E (energy) in Einstein's $E=mc^2$ if c is taken to be a cosmic unit (if c is 1 then $c^2 = c$) and if the speed of light is enumerated in the parochial terms of, say, kilometres per second (in which c squared does not equal c).

An argumentative Scholastic might well ask whether the very concept of a mathematical system is coherent, or if mathematics as a whole is a kind of systemic self-sustaining tautology. Is the always problematic concept of 'zero' coherent and how does this relate to debates about 'nothing'? How does Cantor's notion of infinities relate to issues raised around the concept of eternity? Aquinas, Bonaventure, and Pecham were familiar with the notion of different kinds and measures of infinity: it was an element in their arguments that if the universe was 'eternal' then there would have been an infinity of orbits of the sun (assuming that the sun went round the earth) and also therefore twelve times that number of orbits of the Moon around the Earth. Twelve times infinity was a concept which they could certainly entertain, though they might have agreed with Aristotle's argument that there can be an abstract infinity but not an actual infinity. One might note that Gödel came to the view that in effect time is non-temporal, basing his conclusion upon implications in Einstein's own theory of relativity: it was a regular topic of conversation when they strolled together at the Princeton Institute. And so on.

Recall scene 7 in Brecht's *Galileo*, in which two Cardinals and Galileo debate the shape of the world in relation to the shape of the mind.

> *Barberini*: No? He insists on a serious conversation. All right. Are you sure, friend Galileo, that you astronomers are not simply concerned with making your astronomy more manageable? . . You think in terms of circles and ellipses arid equal velocities, simple movements that your mind can grasp. But what if it had pleased God to make his stars move like this? (*With his finger moving at varying speeds he describes in the air an extremely complicated track.)*
> *Galileo*: Your Eminence, if God had constructed the universe like that (*he repeats Barberini's track*) then he would also have constructed our brains like that (*he repeats the same track*) so that they would recognise these very tracks as the simplest possible. I believe in reason.
> *Barberini*: I hold reason to be inadequate. – He is silent. He is too polite to say now that he holds me to be inadequate. (*He laughs and returns to the balustrade at the back.)*
> *Bellarmin:* Reason, my friend, does not reach very far. All around we see nothing but crookedness, crime and weakness. Where is truth?
> *Galileo angrily:* I believe in reason.

It seems an appropriate text as I contemplate Pecham's resting place. Or rather, his partial resting place. Apparently his heart was removed for separate burial in a Franciscan cemetery elsewhere.

perspectiva

I can now consider the main 'scientific' work by Pecham, on optics, his *Perspectiva communis*. Anyone who has read Umberto Eco's novel *The Name of the Rose*, or seen the film based upon it, will recall the Franciscan detective, played by Sean Connery in the movie version, whose name 'William of Baskerville' echoes the title of the Sherlock Holmes story *The Hound of the Baskervilles*. We are insistently reminded in the film that Friar Baskerville wears glasses, as a sign of his intellectual credentials, someone who has spent many years poring over documents. This also indirectly anticipates the most spectacular event of the narrative: the burning of the great library of precious manuscripts, including the 'lost' treatise by Aristotle on comedy. That elusive treatise is the trigger for the murderous events unfolding in the tale, but the immediate occasion for Baskerville's visit is a gathering of eminent ecclesiastical figures for a contentious debate about the appropriate role of poverty in the church. Eco's 'William of Baskerville' is fictional, but one of the figures whom I suspect contributed to his composite character was the English Franciscan friar John (of) Pecham, writer on both optics and ecclesiastical poverty.

I admit that the claim I make to visitors, that Pecham contributed to the invention of spectacles, is perhaps a bit stretched, but there are reasonable grounds to support it. The elderly archbishop whose tomb is tucked away in this corner of the cathedral was once famous for a treatise on optics which was perhaps the most widely used text-book on the subject from the 14th century right through to the 17th century. His work is usually given the title *Perpectiva communis*, and at least sixty manuscripts have survived, compared with much smaller numbers for the optical writings of, say, Roger Bacon or Witelo. Pecham's text was prescribed reading at several European universities from the 13th century onwards and was first printed by Petrus Comenus in Milan in 1482, with several subsequent editions in, for example, Leipzig, 1504, Venice, 1504, Nuremberg, 1542, Cologne, 1580, 1592, and 1627. There was also an Italian translation, *I tre Libri della Perspettiva Commune*, published in Venice in 1593. So Pecham's work was clearly significant, and almost certainly influenced whoever did invent spectacles.

Frustratingly, the meagre evidence for the first appearance of reading glasses doesn't allow us to pinpoint the moment or place at which we can definitively say that they were invented. Most probably, spectacles first came into use in Italy in the 1270s. In that decade the Papal court was intermittently located in Viterbo and the regular entourage included the

Dominican friar William of Moerbeke and the Polish scholar Vitellonius, or Witelo. Witelo wrote a work on optics, probably in the later 1270s, which he dedicated to William, a prolific translator into Latin of Arab philosophy and science texts including (arguably) the most important of the Arabic writers on optics, Al-Hazen. Pecham joined the papal court at Viterbo in about 1277 as a Papal Theologian, and he had probably already written a shorter version of his own treatise on optics some years previously, perhaps for students at the Francisican house of studies in Oxford where he taught in the 1270s. That text has been published in a modern edition, as *Tractatus de perspectiva*. Later, and possibly even after his appointment as Papal Theologian, he produced a longer version, probably by 1278. Two versions of the more substantial *Perspectiva communis* have survived in various manuscript traditions.

In 1267 the Oxford Franciscan Roger Bacon had sent to the Pope his *Opus Maius*, an ambitiously comprehensive work, surveying the entire range of contemporary scientific thought, composed in order to gain papal support for such inquiries. Unfortunately, the sympathetic Pope Clement IV who had requested the *Opus Maius* died before Bacon's bid for papal support could be heard, but it is possible that Bacon's manuscript may still have been available in some form at the papal court. Bacon's work included a long section on optics, which dates back to the 1260s and Pecham may have been already familiar with it. Given the likely presence at the Viterbo court in the 1270s of several manuscripts on on how the eye works, and on various problems of how light is affected by mirrors and lenses, it would not be surprising if somebody in that small circle had taken the crucial step of combining magnifying lenses and a nose-frame in such a way as to enable ageing scholars to see better, especially when reading and copying manuscripts.

The copy of Roger Bacon's ambitious work intended for the Pope may have disappeared into the papal archives, but Pecham's treatise on optics was widely read. For example, Leonardo da Vinci, in his manuscript notes on light, translated into Italian the introduction to Pecham's *Perspectiva communis*. Leonardo probably read one of the several printed editions, which incorporated into Pecham's text substantial passages from Witelo's treatise, and vice-versa, thereby confusing the issue of which of them was indebted to the other. It was also probably a printed edition of Pecham-Witelo which influenced both Kepler and Galileo in their study of optics.

So the work of an English Archbishop of Canterbury perhaps contributed indirectly to Galileo's use of the new invention of the telescope, leading to the most famous controversy concerning the claims of science and the teaching of the church. In England itself Pecham's *Perspectiva* was only finally replaced as a standard work after the publication of Newton's *Opticks* in 1704. It would be tempting to trace the study of 'optics' from Pecham to today's digital image-processing, including the endless taking of

photos by visitors to the cathedral. Let me instead focus, if that's the right word, on Pecham's own work.

light again

Eyesight and light were much more immediate concerns, and potential puzzles, for a mediaeval monk or friar than they are for most of us now. Since for millenia the only man-made light was that of a fire, a burning torch, a candle, or some form of portable flame in a lamp, people in Pecham's time were generally much more dependent upon sunlight and moon-light, and far more conscious at night of the visible stars and the overall circular movement of the 'constellations' across the sky, including the 'wandering' stars or planets, of which only five were then identified. Though the cathedral nave today is not the one known to Pecham we can still register the play of light as it enters through the great windows and forms deep shadows or vivid shafts upon the floor and columns of nave and choir, whether in sunlight or moonlight, and we have already considered the impact of the stained glass windows in the cathedral.

Thanks to the perpetual round of liturgical offices or monastic 'hours' throughout every day and night, monks in particular were routinely familiar with the patterns of dawn and sunset, with the stars becoming visible, and the phases of the moon. Entering the cloisters at night you can still be conscious of how the regular arcaded walkways of the quadrangle could have acted almost as a giant time-dial, especially as the mediaeval sky was hardly obscured by light pollution. The study of astronomy, the visible configuration of the stars, was deeply practical, as an aid to fixing the chronology of the years, or determining the correct dates for liturgical feast-days, as well as for navigating on land and sea by observing the patterns of stars or the angle and direction of the sun.

The study of optics was linked to 'practical geometry', which enabled the surveying of monastic lands, or the estimation of distances by using line-of-sight calculations of the summits of mountains or tall buildings such as cathedrals, themselves partly built with the aid of the quasi-geometrical drawings sometimes found incised into the floors of cathedral craftsmen's workshops. The circumference of the whole earth had been plausibly calculated upon the basis of measuring the heights of mountains, using complementary angled sightings no more than a few hundred metres apart, combined with basic trigonometry. Astronomy was also linked to astrology, while the mysterious nature of light itself was sometimes given mystical, theological, or moralising significance. Light was frequently treated as a metaphor for the radiation of God's grace, or as signifying divine illumination, or as literally the first manifestation of God's creation. The New Testament refers to Christ as the light of the world, while Paul in *Corinthians I,* 13 :12, speaks of our seeing only dimly as in a mirror but claims that we will someday see directly – an image likely to stimulate an

interest in mirrors and eyesight. And so on. Yet Pecham's text, the *Perspectiva communis*, eschews any such spiritual concerns and is severely 'scientific', if not quite in a mode of 'scientific writing' we would recognise today. Which is where the issues I am mainly concerned with come to the fore.

Though there are numerous accounts of 'mediaeval science' it is fairly uncommon to find, outside specialist publications, accessible instances of what counted as the procedure of a 'scientific argument'. So, as with his philosophical texts, I want to include some excerpts from Pecham's treatise on optics. I am not suggesting that you now read Pecham to find out how the eye works, but rather to consider how in practice a 'scientific' problem was treated by him. I am, if you like, bringing a magnifying glass onto his text and, eventually perhaps, constructing a pair of spectacles through which to observe 'mediaeval' and 'modern' science.

reading optics

Since few people today would choose a textbook on 'optics' as their preferred leisure reading, it may not even be obvious what Pecham's work was about. A modern edition and translation of the *Perspectiva communis* by David Lindberg, published in 1970, lists the 'propositions' which comprise the work, arranged as follows:

Part I. Vision proper or vision by direct rays.
The properties of light and color and their propagation.
Anatomy and physiology of the eye and the act of visual perception.
Physical requirements for vision.
Psychology of vision.
Errors of direct vision.

Part II. Vision by reflected rays.
The properties and law of reflection.
Image formation by reflection.
Perceptual errors occurring in vision by reflected rays.
Burning mirrors.
The twinkling of stars.

Part III. Vision by refracted rays.
The propagation of rays through transparent media.
Image formation and perceptual errors in vision by refracted rays.
Refraction of rays within the eye.
The burning glass and the kindling properties of rays.
The rainbow and the Milky Way.

Lindbergh comments:

> Since the *Perspectiva communis* surveys virtually the entire field of optics, it may appear that the title *Perspectiva* (or at least the English cognate *Perspective)* is inappropriate to the contents; for the book deals not only with perspective, but with all medieval questions that could be classified as optical. In fact, however, the title provides a great deal of insight into the character of Pecham's treatise – and, indeed, of medieval optics in general. Pecham's principal objective was to describe how objects appear *to an observer,* whether by direct, reflected, or refracted rays. He explains how a person sees, how he judges size and shape, how errors of vision arise, and where objects seen by reflected or refracted rays appear to be situated. Thus, while Pecham deals with the full range of optical problems, his frame of reference is that of perspective – the appearance of things to an observer. The essential characteristic of medieval optics, distinguishing it from modern optics, is that there is no optical problem without an observer. Medieval optics is a theory of vision.

Given the modern use of the term 'perspective' it is worth adding a *caveat* from a review by Bruce S. Eastwood of Lindberg's edition:

> A familiarity with the *Perspectiva communis* among 15th century artists does not mean that the treatise was important to 15th century artistic developments. In fact, the *perspectiva* of the liberal arts, represented on Sixtus IV's tomb, is quite the opposite of the artistic perspective of Brunelleschi and Alberti. Unfortunately the University of Wisconsin Press was misled by Lindberg's pregnant brevity here and claimed on the dust jacket that 'many Renaissance painters relied on Pecham's treatise in developing theories of perspective'. Hopefully, readers will ignore that extravagance. (*Speculum*, Vol. 47, No. 2, Apr., 1972, pp. 322f.)

This comment is itself perhaps too severe an assessment, and the connection cannot be so completely dismissed. For example, a study by Paul Hills, *The Light of Early Italian Painting* (1987), highlights the influence of Pecham-Witelo on the compositional attention to shadows in Renaissance painting.

geometry

Pecham's treatise is divided into three 'parts' and about 160 'propositions', as numbered in some manuscripts. Like the term 'quaestio', 'propositio' does not necessarily indicate a position held by Pecham, but refers to a

problem or possible opinion to be considered. What primarily interests me is not the particular details of the arguments but how we might respond as readers to the way in which Pecham argues. I give references to Lindberg's edition and numbering but try sometimes to use my own translations of Pecham. A version of a *Perspectiva communis* manuscript is available on-line and several print-on-demand copies of early printed editions. They all variously differ from each other.

Here, for example, is Proposition 39 in Bk II:

> Since it is possible for a ray not to intersect the perpendicular in concave spherical mirrors, the location of the image must be different from the foregoing.

That 'foregoing' refers the reader back to the previous 'proposition' in Pecham's text:

> That in pyramidal mirrors the image becomes smaller as the place of reflection approaches the vertex.

But the claim given under that 'proposition' is simply a laconic cross-reference which hardly helps us:

> This is apparent from what was said about convex spherical mirrors above in XXXIV.

Clearly, Pecham's treatise is at least partly constructed as a series of systematic interconnections between problems or 'propositions', and in that respect it is similar to what we would find in any textbook today. And it also has that irritating textbook way of telling us that something is obvious from an earlier argument without explaining why it is obvious!

Yet at some point we have to understand the proposition in front of us in order to follow any inter-connecting arguments between propositions. So here is the argument supporting Book II, Proposition 39, as translated from the Latin text in Lindberg's edition. You might here take a deep breath.

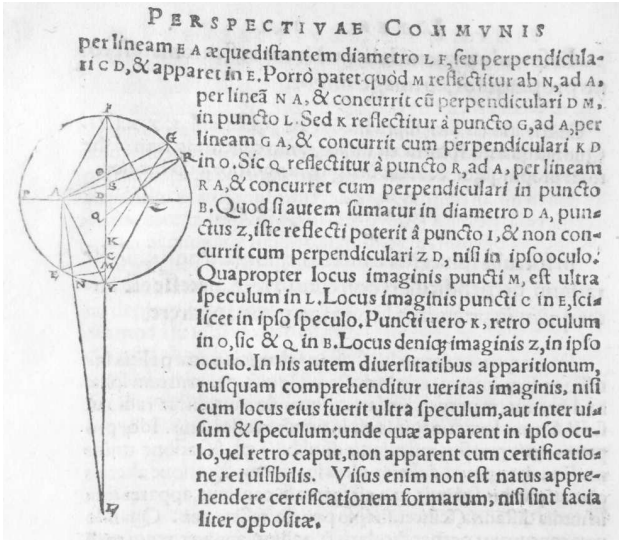
> For example, let *FPY* be a concave mirror with its center at *D*. Draw diameter *DA* and let *A* be the eye. Draw another diameter *YF* intersecting the first one perpendicularly. Draw *AE* parallel to it, and mark points *M, T, K,* and Q on diameter *YF*. It is clear, then, that *AE* does not intersect the perpendicular. *M* is reflected from point *N,* and intersects the perpendicular outside the mirror at point *L*. *T* is reflected from *E* and does not intersect the perpendicular. *K* is reflected from point C and intersects the perpendicular at point *S*. Q is reflected from point G and intersects at point O. However, if we consider point Z on

diameter *DA,* it also can be reflected from point *E,* and ray *AE* intersects perpendicular *ZD* only in the eye itself.

Therefore the image of point *M* is located beyond the mirror at *L,* the image of *K* behind the eye at *S,* the image of Q behind the mirror at *O*, [the image of] *Z* in the eye itself, and the image of *T* in the mirror. Since *T* is a divisible point, it should appear beyond the mirror according to its higher part, but within the mirror according to its lower part. However, since form is one, it must appear in the intermediate place, namely, on the mirror itself at point *E*. Nevertheless, in these various appearances, the truth of the image is not perceived except when the image is located beyond the mirror or between the eye and the mirror. Thus those images that appear in the eye itself or behind the head do not have their appearance certified as does an object [directly] visible, because it is not natural for sight to perceive forms unless they are opposite the face.

Had enough? I suspect that most readers will have simply given up after the first sentence or so. Despite concentration and persistence, some parts of this passage will probably still baffle us, even if we have managed to follow the description in the first place. Which surely involves actually constructing a diagram, making a drawing, but I doubt if many readers, either then or now, could confidently do so on the basis of that text. So here's one I copied earlier. It's from the 1542 printed edition:

To make the exercise a shade more challenging note that this version uses different lettering from Lindbergh's text, and a partly different text.



PERSPECTIVAE COMMVNIS

per lineam E A æquedistantem diametro L F, seu perpendicula-ri C D, & apparet in E. Porrò patet quòd M reflectitur ab N, ad A, per lineā N A, & concurrit cū perpendiculari D M, in puncto L. Sed K reflectitur à puncto G, ad A, per lineam G A, & concurrit cum perpendiculari K D in O. Sic Q reflectitur à puncto R, ad A, per lineam R A, & concurret cum perpendiculari in puncto B. Quod si autem sumatur in diametro D A, punctus Z, iste reflecti poterit à puncto I, & non concurrit cum perpendiculari Z D, nisi in ipso oculo. Quapropter locus imaginis puncti M, est ultra speculum in L. Locus imaginis puncti C in E, scilicet in ipso speculo. Puncti uero K, retro oculum in O, sic & Q in B. Locus denique imaginis Z, in ipso oculo. In his autem diuersitatibus apparitionum, nusquam comprehenditur ueritas imaginis, nisi cum locus eius fuerit ultra speculum, aut inter uisum & speculum: unde quæ apparent in ipso oculo, uel retro caput, non apparent cum certificatione rei uisibilis. Visus enim non est natus apprehendere certificationem formarum, nisi sint facialiter oppositæ.

Lindberg's own diagram looks markedly different (Lindberg, p. 193, bk ii, 39):

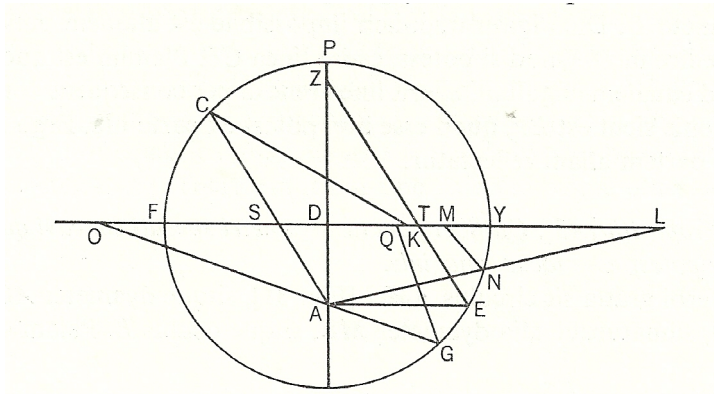


Fig. 29

Now re-read the account earlier:

> Let *FPY* be a concave mirror with its center at *D*. Draw diameter *DA* and let *A* be the eye . . .

You might try to regard A as an eye standing in front of a concave mirror which stretches from F through P to Y. …. Does it help?

demonstration

My crucial point is that the diagram *looks* as if it is some form of geometrical demonstration, but in what sense is it 'demonstrating' proposition 39? Is the diagram a proof (of what?), or is it a representation of a configuration which the text simply (or not so simply!) describes, a visual illustration and not a way of working out a problem? Bear in mind, by the way, that this 'proposition' and the diagram mainly concern 'visual rays': so some of the lines in the diagram are meant to trace the direction of 'lines of sight', not rays of light. You might, at this point, ask how you understand the difference.

If the semicircular line FPY represents a mirror, does the semicircular line from Y through G to F also 'represent' something? And if A is the eye, you might ask where the viewpoint upon the whole diagram itself is to be located. And where, incidentally, is the 'location of the image' of this entire diagramatic set-up? On the page or in my eye? Or in my 'mind'?

Now, try just to *think* about what you might see when looking into a concave mirror, at your own reflection and at objects you might hold up in front of the mirror or have in the room behind you. Now try actually doing so, using a physical concave mirror (for example a shaving mirror). How

would you either describe or draw the relation between the eye's position (and any eye-line directions?), and where the images now *appear* to be located, where we *seem* to see them?

However even if one can now follow this complex description with the aid of the Lindberg diagram, or from looking in a mirror, one would still like to know quite what to make of Pecham's remarks concerning 'the image of K behind the eye at S', or 'images that appear in the eye itself or behind the head'. If the 'location' of 'images' can indeed be calculated by a kind of geometrical mapping then 'images' can 'appear' at some of the points of intersection so calculated. But in what sense can an 'image' appear 'behind the head'? Can we even see an image behind our head? Does this simply mean that we can turn round to look? Or rather is the image we see actually in the mirror in front of us even if it is an image of what is physically behind us? Or can an 'image' be independent of anyone seeing it? Or has the diagram or geometry gone awry? Something odd has happened if this is an explanation of how *we see* images.

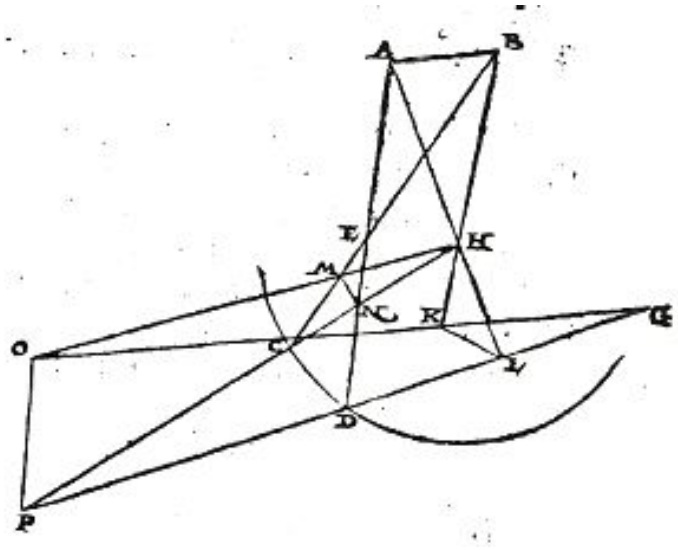
Though it may challenge your patience, try one more 'proposition'. And remember that the original is in Latin! Here is Proposition 50 in Book II:

> *In concave mirrors things sometimes appear reversed and sometimes inverted.*
> This is easily demonstrated from the book *De speculis,* since rays converge in one place and not in another. When they intersect, however, those objects that are situated before the locus of intersection of the rays appear as inverted while those that are beyond that point appear as they actually are. For example, ray *BA* is reflected to *E* and ray *BG* to *D*. Since the rays intersect at point Z, objects located before that intersection must appear different from those that are beyond it, since those that are before [Z] appear inverted as in plane mirrors, and for the same reason, while those that are beyond appear as they are. This is demonstrated according to the principle that things seen under higher rays appear higher. For although the image at the intersection of *EO* and *DQ* appears inverted, nevertheless the configuration of the rays that excite the eye is more effective in altering sight than is the arrangement of the perpendiculars, since the latter are imaginary lines. But the author of the book *De speculis* has not understood this, and I believe he has erred. However, if anyone wants a more lengthy demonstration he should consult the sixth book of [Al-Hazen's] *Perspectiva.* But if the lower part of *ST,* which is between the place of intersection and the mirror is seen by means of a higher ray, and vice versa, it obviously appears inverted, and the inversion is easily evident by extension of the perpendiculars to beyond the mirror.

What do we make of this? For a start, Pecham uses another familiar textbook gesture, of saying that the argument is easily demonstrated *elsewhere*, referring the reader to two other texts, the *De speculis* (which may

refer to a text once attributed to Euclid) and the *Perspectiva* (presumably that of Al-Hazen), neither of which you are likely to have immediately to hand. And in any case Pecham criticises one of those other authors for getting things wrong.

Even after repeated attempts, this passage is, I would suggest, almost unintelligible to a reader. Crucially, again, it surely needs a diagram to go with the argument. Yet in relation to this Proposition Lindberg records that two of the main manuscript traditions for the *Perspectiva* don't provide any diagram at all, and another two 'greatly confuse it'. One can readily see why that might have happened! Here, anyway, is the corresponding diagram from the 1542 edition, which again relates to a slightly different version of the text.



imaginary lines

It's time to ask about the status of such diagrams, even if we could draw them correctly. The text says at one point: 'the configuration of the rays that excite the eye is more effective in altering sight than is the arrangement of the perpendiculars, since the latter are imaginary lines'. But aren't they all 'imaginary lines', not just 'the perpendicular ones'? We certainly never *see* any of these lines except perhaps the curved shape which represents the physical mirror. Yet quite what are the lines 'imagining' or 'imaging'? What are *we* imagining as we try to make sense of these diagrams? What are they drawings *of*? What are those lines *of*?

Reading through these fairly typical 'propositions', several things intrigue me, and I suspect that in your own reactions there might be somewhat

similar responses. For a start, I recognise that though I might, with considerable application and concentration, follow Pecham's analysis and how his text relates to possible diagrams, I tend gradually to slide into allowing my own eyes and brain to glaze over.

I am uneasily aware that what is being discussed is, almost disconcertingly, supposedly an exposition or explanation of a process that is supposedly happening even as I read – that is, while I am focusing on a visual figure with my eyes (and glasses!) – and that this very text is apparently seeking to clarify what is going on as I am seeing, including looking at the page in front of me.

Even so, I quite quickly seem to lose any connection between 'seeing' and this demonstration. Is this really what 'seeing' involves? In one sense, yes, perhaps. Somehow, it seems oddly askew. Yet how, after all, do I envisage the process that is happening as I see or read the text in front of me, or look in a mirror, or through a window? In addition, I realise that my attention seems almost completely misdirected, partly because much of the work of comprehension has apparently already been done for me. I am not currently constructing these diagrams myself, working them out from the prose description, since I have been presented with them (if at all!) already constructed and completed. I am not following a work in progress, a process of understanding, but a version of an already fixed conclusion, a finished diagram.

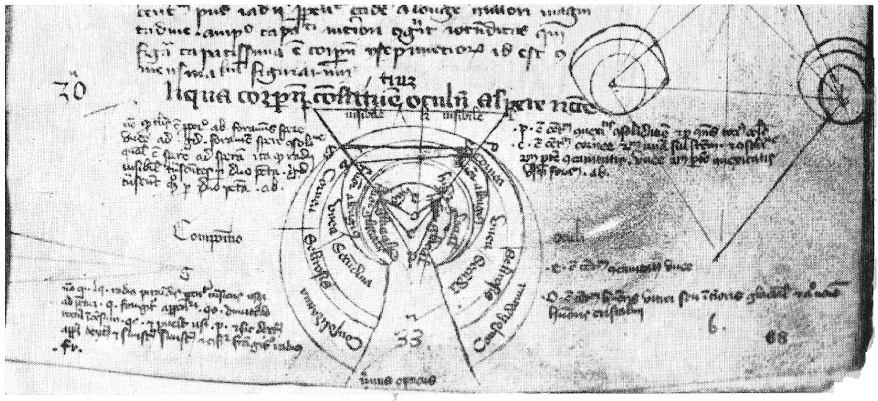
Moreover, while Pecham's Latin is in fact relatively straightforward, a written prose account in any language does not readily lend itself to describing a geometrical, or quasi-geometrical, construction. So either I get out my pen and paper (or stylus and wax tablet) and try to construct each diagram for myself, using the prose as a set of drawing instructions. Or I tend to treat the prose as itself an illustrative accompaniment *to* the diagram, not vice-versa, and so either way I end up mainly checking one against the other. I may thereby almost fail to follow the argument itself, feeling more or less satisfied if I can simply make the prose and the finished diagram 'match' each other.

Or should I now put the description and diagram aside and try to construct my own diagram as I look in a mirror? But I won't actually see any of those 'lines', light rays or sight-lines, as drawn in the diagram. Indeed, I might also now ask if Pecham's text could possibly have been delivered as a series of spoken lectures to a class of students. You might at this point ask a friend to read out the text to you while you try to draw the accompanying diagrams. It's one way to lose a friend. Or did Pecham's students not only look at diagrams (how did he show them?) but peer at themselves in mirrors?

In any case, the diagrams are themselves at the core of a problem. Not just that Lindberg comments several times on disparities between different manuscript versions of the 'same' diagram and notes definite mistakes in some manuscripts. He acknowledges that he has himself, in effect, 'tidied

up' some of the diagrams for his own edition, and the several early printed versions which I have used presumably did the same, with varyingly different results. And we don't have Pecham's own autograph manuscript or lecture notes to check what he originally drew. Those early printed editions are difficult enough to decipher anyway, but below is a fragment of a page from one fourteenth century manuscript of the *Perspectiva* (the lowest diagram is of the structure of an eye). Try type-setting that page. Or just copying it.

Now think about those sixty surviving manuscripts of Pecham's work and the task of making exact handwritten copies, not just of the text but also of the diagrams. Clearly, even the early printers had difficulty ensuring that they arranged the lines and assigned the various letters of the alphabet, correctly correlating text and diagram. We can now scan and reproduce such manuscript diagrams or printed images. But does it help?



scientific

When, as used to be quite common, people castigated the mediaeval 'scholastics' for not developing what we now think of as 'proper science' what was frequently neglected or simply ignored is the sheer difficulties involved when you work in manuscript, especially when copying diagrams from previous handwritten copies of copies of diagrams. Consider also the difficulties of exactly transcribing, from manuscript to manuscript, any complex tables or calculations, and even of accurately performing, let alone recording and replicating, calculations in Roman numerals.

There was also the basic problem of having access to reliable manuscripts, whether to read or to copy, or even knowing that they existed in some other monastery's library and being able to travel there to read, memorise, or borrow a hopefully reliable manuscript. Certainly, the whole

process was not much like sitting at a laptop connected to the internet. When Roger Bacon did finally send his precious *Opus Maius* to the papal court he entrusted the manuscript to a young boy – who walked all the way from Oxford to Rome carrying what may have been at the time the only complete copy. No wonder the burning of the library in *The Name of the Rose* figures as a major disaster.

Further issues might be raised. There are diagrams in the manuscripts but how did Pecham illustrate his 'propositions' when he was actually lecturing on optics? Thirteenth-century university education was largely oral instruction. How could Pecham present the diagrams to his students? There were no large blackboards on which to write or draw as he spoke. Did he use a sandbox, or draw in chalk on the wall, or perhaps on the floor? Or provide some kind of manuscript hand-out? Did the students each attempt to follow the argument by drawing on a slate or wax tablet as they listened? In any case, did they really manage to follow these intricate instructions while he spoke? Did Pecham bring in a large mirror or several small ones to pass around the class?

Or in fact were oral lectures on optics practically impossible and students instead had to find, and copy for themselves, a manuscript of the text, hopefully one with correct diagrams. There was a commercial trade in Paris where students could hire *pescia*, segments of manuscripts, which they could copy for themselves and then return to the bookseller. Incidentally, you might try devising an appropriate (oral?) exam for Pecham's course on optics. One question might involve distinguishing between 'imaginary' and 'real' lines.

experiments

One reaction to the short passages I have quoted may be considerable surprise that a 'mediaeval' writer such as John Pecham even wrote such a text at all, or that it was used so widely. A dominant assumption, at least in an English educational system which still largely ignores any intellectual history before 1500, is that 'science' only really begins in the seventeenth century. Some might be aware that there was a series of texts about optics, from Euclid to Newton, but faced with an actual example of a mediaeval work on optics some might still be surprised that such work could be written in the 13th century – and by a Franciscan, an ordained friar, an archbishop.

Again, one of the persistent assumptions about 'the middle ages' is that, even if they did inquire into such topics as light or motion or vision, they 'never did experiments'. That partly depends on what is meant by 'experiment'. After all, several of the great cathedrals in Europe were built 'experimentally' and some of those experiments went badly wrong (the

cathedral at Laon collapsed, for example). But let us focus (that apt term) a little closer.

Here is a fairly standard account of one of the most renowned experiments by Isaac Newton, truncated here from Michael White's popular biography *Isaac Newton: The Last Sorcerer* (1997), p. 59:

> Newton's first experiments, begun during the summer of 1664, were probably his investigations into the nature of light. Years later these appeared in the *Opticks*, first published in 1704.
>
> His earliest interest in light began when he bought a glass prism at the Stourbridge fair, held on a piece of land beside the river about a mile from the centre of Cambridge. Amid stages for the jugglers and clowns, minstrels and children's games, dancers and actors, stood stalls selling all manner of oddities – trinkets from exotic travels in Bohemia, potions and elixirs, and toys. It was from such a stall that Newton purchased his prism.

As if he was just casually buying a toy. After more of the local colour we get down to the issue:

> Writing to Henry Oldenburg, the Secretary of the Royal Society, some eight years later, Newton described his earliest experiments with the prism:
>
> <I procured me a triangular glass-prism, to try therewith the celebrated Phenomena of Colours. And in order thereto having darkened my chamber, and made a small hole in my window-shuts, to let in a convenient quantity of the sun's light, I placed my prism at its entrance, that it might be thereby refracted to the opposite wall. It was at first a very pleasing divertissement, to view the vivid and intense colours produced thereby . .>
>
> With the prism he was able to see that white light is composed of a range of component colours and how it can be split into the colours of the spectrum, with blue light, at one end of the spectrum, being bent (or refracted) more markedly than red light, at the other end. Furthermore, he was able to judge - correctly - that the colour of an object depends upon which part of the spectrum is aborbed by it and which part reflected. 'Hence redness, yellowness etc.', he wrote, 'are made in bodies by stopping the slowly moved rays without much hindering of the motion of the swifter rays, & blue, green & purple by diminishing the motion of the swifter rays not of the slower'.

One might, incidentally, ask what exactly Newton meant by 'slowly moved rays' and compare it with Pecham's equally unexplained 'higher rays'. White continues his account:

Following this discovery, Newton copied out an extract from Descartes's *Dioptricks* and wrote after it:

> <Of Light : Light cannot be by pressure for we should see in the night as well or better than in the day we should see a bright light above us because we are pressed downwards . . there could be no refraction since the same matter cannot press 2 ways, the Sun could not be quite eclipsed, the Moon & planets would shine like suns. A man going or running would see in the night ... >

Throughout the summer and autumn of 1664 Newton conducted further experiments and observed diffraction through feathers and different fabrics held up to the light: 'A feather or a black riband put between my eye and the setting Sun makes glorious colours', he observed. But then his fervour for experiment seemed to take him over. Within days he performed two experiments that left him almost totally blind.

A BBC TV programme some years ago dramatised the life of Sir Isaac and highlighted this very episode with the prism as a crucial turning point in his career and indeed in the entire history of 'science'.

Yet using a prism to explore aspects of light was not itself new. We know that the Greeks and Romans were familiar with how a prism generates a rainbow of colors, and numerous writers recorded the brilliantly coloured glitter of light through the artfully cut faces and angles of precious jewels. Newton himself, after all, refers to the 'celebrated' phenomenon of how a prism splits light into different colours. It might incidentally be noted that his comments on the inadequacy of Descartes's thesis are quite independent of the experiment with the prism.

Now compare that account of Newton's 'experiment' with Pecham's 'proposition XIX' in *Perspectiva* Part III, where he mentions having resort to a prism, which he calls a 'hexagonal stone', as part of his inquiry into the proposition he is investigating, which is:

> *The cause of the circularity of the rainbow resides principally in the cloud.*
> When a cloud is suspended regularly, [all parts] equidistant from the earth, it is certain that moisture descends [from it] regularly, and this suffices to produce the circularity [of the rainbow]; other clouds suspended roughly and irregularly do not contain regular impressions. Some people, however, assign the cause [of the rainbow's circularity] to the rays, maintaining that light rays enter a spherical cloud and then converge to a point on the other side, (as explained in Proposition 16 of this part); then, after intersection, the light spreads out a second time into a pyramid [cone], half of which falls into the cloud and consequently produces a semicircular impression, while the other half falls on the earth. But *in opposition to this*, *let a solar ray fall through a circular aperture; it is certain that it will be circular. In front of the ray, place a hexagonal*

> *stone that generates the colors of the rainbow;* it is certain that *the rainbow is generated not in the shape of the ray, which is circular, but in the shape of the stone, which is columnar.* Therefore, if a similar event has a similar cause, the cause of the shape of the arc must be sought in the cloud and not in the ray. (my italics)

Pecham's 'circular aperture' is like Newton's hole in the window slats. Pecham here uses the evidence of the effects of a prism to refute what he regards as a mistaken theory about the 'circularity' (*rotunditatis)* of a light ray, which is the puzzle he is considering as part of an inquiry into the colours of a rainbow. He quite readily deploys a sunbeam and a prism on his table to 'model' a rainbow in the sky.

The difference is not that Newton conducted an 'experiment' while Pecham did not, but that – using basically similar apparatus – they were asking different questions and looking at different aspects of what they saw. It is important, of course, that they constructed rather different further 'experiments' and that some of Newton's were indeed innovative.

We can also note, however, that at least sometimes Newton and Pecham both looked at and recorded what seems to have been the same phenomenon, even when they saw it differently. Pecham had, after all, also noticed the plumage on birds and how it shines with a shimmer of colours. Here he remarks on the neck of a dove (Part I, Proposition 12):

> *The colours of bodies appear varied according to the different lights shining on them.* This is clearly evident in certain colours that appear cloudy in a moderate light, but clear and brilliant in an intense light; in fact, their appearance in sunlight is wholly different from that in candlelight. Furthermore, all coloured things are deprived of the customary beauty of their colour during a solar eclipse. Moreover, the same thing appears on the neck of a dove, which assumes different appearances when variously viewed and variously illuminated, even though it is of a single colour. The explanation of this is that colour is capable of being excited by light; and the more it is excited by light, the more efficaciously it acts [on sight]. However, weaker colours are in stronger colours as the imperfect is in the perfect; therefore the degree of perfection of colours in acting [on the sight] corresponds to the [degree of] perfection of the light.

In another version he considered an alternative explanation:

> Yet some think it otherwise on the neck of a dove, namely, that different colours exist there according to the diversity of the surface, as [there are] different surfaces formed by the small parts of various feathers and barbs. But this is not so, as is evident to an observer.

Such an 'experiment' is perhaps closer to 'experience' or 'observation', which can indeed be one sense of the Latin word 'experimentum'.

One might be tempted to imagine Friar Pecham closely observing domesticated doves in the monastery garden. In fact, the example of a dove's plumage had already been considered by Roger Bacon before him, and by several other writers well before Bacon, let alone before Newton. Other instances where we might think we have found a direct record of absorbed personal examination of his surroundings can also be traced through a tradition of previous texts. Do the following comments stem from carefully observing church carvings and contemplating monastic fish-ponds, or is it just a long-familiar trope taken from previous writers? Part I, Proposition 9:

> *When the eye is located in a place of moderate brightness, certain visible things, on which a strong light is incident, are concealed from it.*
> This is obvious, for when a strong light is incident on a finely carved body, the carvings are not apparent because they have been hidden by the excessive brilliance that fills the sense of sight. Likewise there are many things that appear bright when placed in darkness, but disappear or at least cease to shine when exposed to light, such as the scales of fish …

We can at least assume that Pecham directly observed the glorious stained glass of his time, though he had almost certainly written this passage before coming to Canterbury as Archbishop :

> Colour also is propagated as radiation, as is manifest to sight when a solar ray traverses coloured glass, for then, through the efficacy of light, the colour sensibly radiates onto a dense [solid] body facing it. But when light or colour is opposed by a dense body, it is reflected as from a mirror. When light and colour are more or less opposed by a transparent body, they depart from their rectilinear paths and are, as it were, broken or bent sideways.

Obviously, Pecham did indeed use what was around him in what we might think of as do-it-yourself exercises. After all, some 'optical experiments' can be conducted almost anywhere and at any time: we always have our eyes with us and we can observe the process of seeing (or not seeing) at any time. As the very first propositions in *Perspectiva* Book I indicate:

> *Light produces an impression in the eye that is directed toward it.*
>
> This is proved by an effect [*hoc probatur per effectum*], for when the eye sees bright lights, it suffers and endures pain. Also, after a glance [at bright lights], images of intense brightness remain in the eye, and they

> cause a less illuminated place to appear dark until the traces of the brighter light have disappeared from the eye. {This truth, proved here in order to make manifest the origin of the rays – that they originate not from the eye but from the luminous body – is made clear in the first chapter of the [Al-Hazen] *Perspectiva* by observations such as these.}
>
> *Illuminated colour produces an impression in the eye.*
>
> This is proved by similar exercises [*hoc probatur experimentis similibus*] Furthermore, if the eye after being directed with a fixed gaze on a bright colour illuminated by an intense light is then turned aside to a colour illuminated more weakly, it will be found that the first and second colours appear intermixed because traces of the aforeseen have been left behind in the eye. From this it is evident that colour excited by light has its own rays distinct from the rays of light.

As with Al-Hazen's do-it-yourself instructions, you could, of course, try these 'experiments' at home. They are at least safer than Newton inserting a bodkin next to his own eyeballs.

Thomas Young

Like Newton, John Pecham sometimes conducted rather more interesting 'experiments' than carefully observing coloured light. There is one particularly intriguing occasion when we don't know exactly what Pecham actually saw, or even quite what he did.

First, however, consider one of the most significant experiments from the early 19th century. Thomas Young, addressing the Royal Society of London, on 24th November 1803, began:

> The experiments I am about to relate . . . may be repeated with great ease, whenever the sun shines, and without any other apparatus than is at hand to every one.

Young's lecture, later published in the *Philosophical Transactions* of the Royal Society for 1804, described the following experiment:

> I made a small hole in a window shutter, and covered it with a piece of thick paper, which I perforated with a fine needle. For greater convenience of observation I placed a small looking-glass without the window shutter, in such a position as to reflect the sun's light, in a direction nearly horizontal, upon the opposite wall, and to cause the

cone of diverging light to pass over a table on which were several little screens of card paper.

I brought into the sunbeam a slip of card, about one-thirtieth of an inch in breadth, and observed its shadow, either on the wall or on other cards held at different distances. Beside the fringes of color on each side of the shadow, the shadow itself was divided by similar parallel fringes, of smaller dimensions, differing in number, according to the distance at which the shadow was observed, but leaving the middle of the shadow always white.

Now these fringes were the joint effects of the portions of light passing on each side of the slip of card, and inflected, or rather diffracted, into the shadow. For, a little screen being placed a few inches from the card, so as to receive either edge of the shadow on its margin, all the fringes which had before been observed in the shadow on the wall, immediately disappeared, although the light inflected on the other side was allowed to retain its course, and although this light must have undergone any modification that the proximity of the other edge of the slip of card might have been capable of occasioning. . . Nor was it for want of a sufficient intensity of light that one of the two portions was incapable of producing the fringes alone; for, when they were both uninterrupted, the lines appeared, even if the intensity was reduced to onetenth or one-twentieth.

This was a crucial experiment later regarded as helping to suggest the wave nature of light, as indicated by the interference pattern which emerges when a light beam is directed through a narrow double slit. It took Young's contemporaries twenty years to accept the implications of his experiment, which eventually became the model for later versions, with electrons and single photons, and crucially established the wave-particle character of all electro-magnetic forms. As Young says, anyone could try the experiment he did – but how few would see the implications.

Now consider the following passages from the Pecham's extended Proposition 7 in Part I. He is investigating what happens to the shape of sunlight when it is directed through a triangular or circular aperture.

> . . when rays advancing through an angular aperture and intersecting one another in and near the opening have been extended in a straight line to a distance.

Note the phrase 'intersecting one another' (*se intersecantes*). Pecham suggests various re-arrangements of his apparatus, to test different hypotheses:.

> [Some argue that] if the aperture were circular, it would cause the incident rays to be round by the power of direct [straight line] radiation; therefore it is clear that by direct radiation the incident rays are non-

circular insofar as the aperture is non-circular. Furthermore, if an opaque circular area [*think of Young's 'card'*] should be inscribed within the equilateral triangular aperture, three somewhat irregular triangles would remain empty at the periphery of the circle.

If this triangle with its inscribed circle should then be placed in the path of the solar rays, the light passing through each of the aforementioned triangles, the corners of the triangular aperture, would [according to some] at length form a round incident beam of small diameter.

If the inscribed circle were then removed from the surface of the aperture, so that solar rays could freely pass through the entire triangular opening, the rays so passing through would at length form a round incident beam of larger diameter; and the aforementioned three circles could not possibly be included in this beam.

Therefore, it is impossible that the small beams passing through the three corners of the aperture outside the periphery of the inscribed circle should, by [straight] radiation, fall on the same circular surface as does the light passing through the interior of the circle inscribed in the aperture.

There is, frustratingly, no surviving diagram for this passage. It is not entirely clear from his account whether Pecham actually performed this intriguing 'three slit' experiment, or what light-effects he chose to examine if he did. But he is effectively conducting the same kind of experimental exploration, and using basically the same simple apparatus as Young, some five centuries later. He is similarly probing what happens when a light beam is split into different 'paths' through slits, and then what happens when they are recombined. I doubt if Pecham ever saw an 'interference' pattern from these 'intersections', if only because his apertures were almost certainly not small enough, and even if he had he would, like Young's contemporaries, have not appreciated its significance.

He does however also suggest a kind of 'thought experiment' (he writes '*haec imaginatio'*, Proposition I. 5), postulating what might happen if the sun was in the shape of a square, or if there was a light-emitting triangular-shaped surface on the sun itself. And he tries to describe, and provide a geometrical diagram to fit, these several imagined variations. But I will spare you.

Again, the problems and the observation in this instance were not necessarily original to Pecham. His aperture experiments may partly derive from a question posed in a text attributed to Aristotle (*Problemat*a, Bk XV, 6: 911b3): 'Why is it that when the sun passes through quadrilaterals, as for instance in wicker work, it does not produce a figure rectangular in shape but circular?' Another question for the optics exam?

There was, undoubtedly, a potential 'practical application' for these aperture experiments. A pinhole camera is simply a room (*camera* in Latin)

completely darkened except for a single tiny aperture, much as Pecham indicates in his account, and one might recall the problems of explaining, even today, how the well-known 'Shroud of Turin' was made. On some carbon datings that extra-ordinary object was almost contemporary with the optical inquiries of, among others, John Pecham. The image on the shroud seems to be, in some form or other, a 'photo-graphic' negative. Photo-graphy simply means using light to draw, though now our digital apparatus draws in pixels rather than using lines.

Another practical application of optical experiments comes to mind. One of Pecham's propositions (Part III, Proposition 10) argues that:

> A visible object situated in a transparent medium, with a flat surface and denser than [the air surrounding] the eye, must appear larger than it is.

Lindbergh (p. 266f) points out several errors in Pecham's argument in this section. But experimenting with bowls of water to measure refractions, or seeing how light is redirected by prisms, spherical mirrors, or glass globes (an essential stage in the procedure of making any form of flat glass, including stained glass), could indeed lead to an awareness that looking at manuscripts through curved glass or through a spherical glass ball could magnify the text. It might then have been a relatively obvious step to move from a single magnifying glass, an 'eye-glass', to having one such glass for each eye, a pair of 'spectacles' – and then perhaps to realise that looking through those two pieces with one arranged behind rather than alongside the other further enhances the magnifying effect. However he managed it, Pecham perhaps found a way of magnifying a manuscript. He would certainly have needed to do so in order to decipher some of the diagrams he was copying.

Islamic optics

Why spend so much time on the now obscure writings about optics of this 13th-century Franciscan Archbishop of Canterbury? Because, I would suggest, what we think of as 'modern science' was profoundly shaped by precisely the kind of geometrical optics which Pecham, following Al-Hazen and others, made widely available to a European intellectual community. Basically, the argument is that what we currently understand by 'science' emerged precisely at the point at which 'mathematical' procedures and 'experimental' methods were combined together, and 'optics' above all constituted the pivotal area of investigation for that convergence.

Which had crucially already taken shape in mediaeval Islam, as splendidly chronicled by Jim Al-Khalili in various television programmes and persuasively argued in his study *Pathfinders: The Golden Age of Arabic Science* (2012). As the Islamic empire grew and consolidated, the Caliph of

Baghdad encouraged the development and application of mathematics, partly to ensure efficient taxes, accurate record-keeping, and reliable map-making, including geometry and what became referred to (in its Arabic form) as 'Al-gebra'. Measuring the circumference of the earth, for example, was not only a scientific inquiry but of considerable practical importance to an empire of merchants travelling ever more extensively, particularly by sea and out of sight of land. There was also a development of 'experimental' manufacturing to meet emergent needs and to support inter-national trade. The minting of reliable coins required exact calculation of the percentages of precious metals and alloys (a branch of 'Al-chemy', or chemistry) while the manufacture of the necessary and profitable commodity of soap, using ashes, was closely linked to experiments in colouring glass, or 'stained glass'. The distillation of perfume, the discovery of 'Greek fire' (petroleum), and the classification of minerals based on a taxonomy of their chemical composition, all strengthened the growing manufacturing basis for this far-flung trade.

In Al-Hazen's *Book of Optics*, written around 1020, there was an explicit convergence, or combination, of mathematics and experiment. In order to examine the disputed question of whether light illuminates *from* the eye or travels *to* the eye (extro-mission versus intro-mission theories) Al-Hazen first established that light travels in a straight line by directing a narrow hollow tube at the light of a candle, the tube's straightness checked by a ruler, and then with the end nearest the candle covered over so as to ensure that the light couldn't reach the eye at the other end of the tube in any other way.

This allowed him to treat both a line of sight and a line of light as straight lines and therefore susceptible to geometrical depiction and calculation. He conducted numerous experiments on reflections in mirrors and the refracting or bending of light, and demonstrated how pinholes could create an image inside a 'camera', explaining how the point-to-point configuration of the image was rigorously inverted from the reality outside the room. And, crucially, in his *Optics* he described his various experiments in sufficient detail that they could be readily repeated and tested by anybody else. Centuries later, Newton's *Optick*s were far more fashionable than his difficult *Principia* partly because he too described possible do-it-yourself optical experiments which any merely amused or scientifically enthusiastic reader could replicate. Al-Hazen presented those various practical investigations arranged in the form of a textbook clearly modelled upon Euclid's mode of assembling a system of axioms and arguments, propositions and corollaries, but crucially reversing Euclid's notion of 'extromission' while retaining his geometrical figures. That arrangement and many of Al-Hazen's specific 'demonstrations' re-appear in Pecham's treatise though with his own variations. It was a model that was to endure.

sight and light

The relationship between 'sight' and 'light' is obviously part of our daily experience, and easily able to provoke the question: how do we see at all? A question which can still amaze if we try seriously to understand it. Especially when we fully register that, according to today's theories, light travels from the sun ninety million miles away for several minutes and then bounces off a miscellaneous multitude of objects – each leaf of a tree, each dust mote in the air, each brick in a wall – and 'enters' our pupil or lens or retina, and is then somehow processed through tiny optical nerves. How does all that get squeezed into those two almost pin-hole apertures in our face and thence into our brain? Even then, how do we *see*? And how is it, for example, that a photon can have travelled for several billion 'light-years' in an uninterrupted (straight?) line from a probably now extinct star to strike my eye and thus glimmer in my personal night sky?

Moreover, as we might think we now know, 'visible light' (or rather the light that makes things visible to us) is only one of a spectrum of electro-magnetic fields surrounding and permeating us. Walking in a garden we might register that we are seeing it only within a certain range of 'visible light' (and birds see it differently), whereas by using, say, a mobile phone we are also activating or 'receiving' (or failing to make connection with) other but 'invisible' sections of the electro-magnetic range. We can easily deploy other instruments such as a geiger counter to indicate radioactivity, though an x-ray machine or an electron microscope is not normally encountered in the back garden. Even our probably somewhat vague awareness of the full electro-magnetic 'spectrum' is difficult to combine with 'ordinary commonsense', though you 'know' that at one level of registration this book you are reading does (I hope) visibly exist to be looked at, while at another it is a concatenation of electrons and protons, sub-atomic particles and probability waves, and that this text may by now be a digitally generated image 'streaming' from a remote website.

We only seem to be a long way from Pecham's diagrams of 'visual rays'. The Arab and later European debates about optical 'intro-mission' and 'extro-mission' centred on the direction in which a 'species' could be said to travel. For some, a 'species' was whatever an object 'gave off' or emitted and which the eye somehow captured or gathered in order for us to see the object as it is, its form, its appearance, its visibility. On some accounts, the term 'species' could be applied not just to a visible form, but any object radiated a range of different 'species', forms, or powers, not just its visibility but its very intelligibility, so that to 'understand' an object was to receive or activate or construct an 'intelligible species', not entirely unlike receiving a decodeable signal. This mediaeval notion or term has often been ridiculed. Nevertheless, had Al-Hazen or Pecham ever managed to use an infra-red or heat-seeking camera and looked at the shimmering outline of an invisible but warm body in the dark night they might have felt that the theory of the

extro-mission of a 'species' was, at least partly, vindicated by a visible shape of temperatures.

However, the late mediaeval account of sight in terms of the reception of a 'species' might still be regarded as only a description of what needs to be explained, and we tend to think that an 'explanation' must operate at either a 'lower' or 'higher' level than the description itself – that, for example, 'quantum mechanics' or 'God' provides what we would recognise as an 'explanation'. We might even assume that there must be another and richer level of explanation than the more abstract ones of theoretical physics or metaphysics, since what could be richer than the experience of 'seeing' which is what we are attempting to explain in the first place?

If the increasing convergence of mathematics and experiment was what comes to be known as 'science' then 'metaphysics', since it involves neither mathematics nor experiment, was increasingly regarded as disqualified or displaced from being acknowledged as a 'science' at all. Pecham's 'questions' about eternity and nothingness were seen as a different domain from his 'propositions' about optics. Perhaps that development has left us with a similar awkwardness of wondering how far such other areas of enquiry as psychoanalysis, sociology, economics, or history can be classified as 'sciences' – and eventually how far the physical sciences themselves can be regarded as providing the kinds of certitude sometimes claimed for mathematics. Yet what kind of 'explanation' does mathematics provide? Can there be experiments in mathematics? Or even observations?

It is, patently, beyond the scope of these wandering considerations upon John Pecham's tomb to try to sketch a history of 'science' from the thirteenth century to today, but I want later to trace particular paths from Pecham's treatise on optics to some current issues, if only because those mediaeval inquiries into light and sight arguably led not only to some of the critical apparatus for later scientific development, including the telescope, the micro-scope, and the humble spectacles, but also acted even more importantly as a paradigm for far-reaching theoretical developments, indeed for 'doing science' at all. Not, of course, that I would regard Friar Pecham as wholly responsible.

Grosseteste

We will come back to these issues but for now I want to look at two more Canterbury figures, differently associated both with the cathedral and the Royal Society, but indicative of two perhaps characteristic responses to 'science'. There are other mediaeval thinkers connected to the Cathedral I might have considered. Robert Kilwardby who was Archbishop immediately before Pecham, wrote several impressively weighty commentaries, including one on the 'new' Aristotelian logic, in relation to the *Prior Analytics*, an extended commentary on Peter Lombard's *Sentences*, and a treatise with the promising title *De ortu scientiarum*, *On the Origin of the*

Sciences – which is largely an introduction to the entire Aristotelian corpus. More originally, he wrote two texts with immediate relevance to some of the themes so far considered, a treatise *On Time* which discusses in familiar disputational form about a hundred propositions about time, and the intriguing *De spiritu fantastico* which is an attempt to understand how we understand, exploring the role of images and imagination as the intermediate ground between the senses and intellect. There was also Archbishop Thomas Bradwardine, now recognised as one of the pioneers of mechanics in the fourteenth century and also the author of the extraordinary *Causa Dei* and an intriguing treatise on verbal and logical paradoxes *Insolubilia* .

However, before leaving the mediaeval period I can't resist quoting another ecclesiastical scientist, and though he had little direct to do with Canterbury Pecham would have been well aware of him. Here is Robert Grosseteste, lecturer to the Franciscans at Oxford in the 1230s and later Bishop of Lincoln, writing on light in his *De luce*, from about 1225, as translated by Claire C. Riedl in *De Luce – On Light*, (Marquette University Press, 1942):

> The first corporeal form which some call corporeity is in my opinion light. For light of its very nature diffuses itself in every direction in such a way that a point of light will produce instantaneously a sphere of light of any size whatsoever, unless some opaque object stands in the way. Now the extension of matter in three dimensions is a necessary concomitant of corporeity, and this despite the fact that both corporeity and matter are in themselves simple substances lacking all dimension. But a form that is in itself simple and without dimension could not introduce dimension in every direction into matter, which is likewise simple and without dimension except by multiplying itself and diffusing itself instantaneously in every direction and thus extending matter in its own diffusion. For the form cannot desert matter, because it is inseparable from it, and matter itself cannot be deprived of form.
>
> But I have proposed that it is light which possesses of its very nature the function of multiplying itself and diffusing itself instantaneously in all directions. Whatever performs this operation is either light or some other agent that acts in virtue of its participation in light to which this operation essentially belongs. Corporeity, therefore, is either light itself or the agent which performs the aforementioned operation and introduces dimensions into matter in virtue of its participation in light, and acts through the power of this same light. But the first form cannot introduce dimensions into matter through the power of a subsequent form. Therefore light is not a form subsequent to corporeity, but it is corporeity itself. . .

> Thus light. which is the first form created in first matter, multiplied itself by its very nature an infinite number of times on all sides and spread itself out uniformly in every direction. In this way it proceeded in the beginning of time to extend matter which it could not leave behind, by drawing it out along with itself into a mass the size of the material universe. This extension of matter could not be brought about through a finite multiplication of light, because the multiplication of a simple being a finite number of times does not produce a quantity, as Aristotle shows in the *Dc Caelo et mundo.* However, the multiplication of a simple being an infinite number of times must produce a finite quantity, because a product which is the result of an infinite multiplication exceeds infinitely that through the multiplication of which it is produced. Now one simple being cannot exceed another simple being infinitely, but only a finite quantity infinitely exceeds a simple being. For an infinite quantity exceeds a simple being by infinity times infinity [i.e. squared]. Therefore, when light, which is in itself simple, is multiplied an infinite number of times, it must extend matter, which is likewise simple, into finite dimensions.

Grosseteste argues that light can extend itself infinitely. By trying to clarify the very concept of 'infinite' he explores some suggestions or hypotheses which some readers might regard as surprising in the 'mediaeval' thirteenth century:

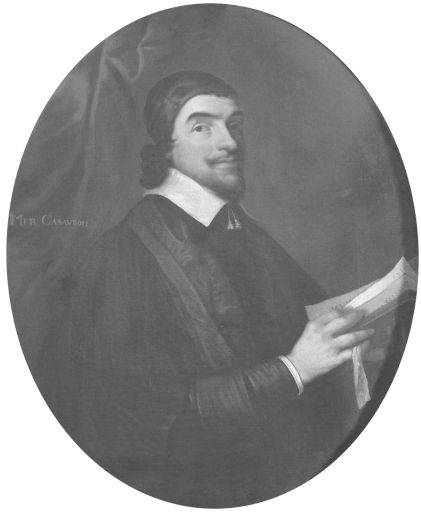
> It is possible, however, that an infinite sum of number is related to an infinite sum in every proportion, numerical and non-numerical. And some infinites are larger than other infinites, and some are smaller. Thus the sum of all numbers both even and odd is infinite. It is at the same time greater than the sum of all the even numbers although this is likewise infinite, for it exceeds it by the sum of all the odd numbers. The sum, too, of all numbers starting with one and continuing by doubling each successive number is infinite, and similarly the sum of all the halves corresponding to the doubles is infinite. The sum of these halves must be half of the sum of their doubles. In the same way the sum of all numbers starting with one and multiplying by three successively is three times the sum of all the thirds corresponding to these triples. It is likewise clear in regard to all kinds of numerical proportion that there can be a proportion of finite to infinite according to each of them.

As it happens, I don't think Grosseteste succeeds, but he is clearly grappling with the problem of how non-dimensional points can somehow be related to lines and planes and solids. In the process he remarks:

> It is my opinion that this was the meaning of the theory of those philosophers who held that everything is composed of atoms, and said that bodies are composed of surfaces, and surfaces of lines, and lines of points. This opinion does not contradict the theory that a magnitude is composed only of magnitudes, because for every meaning of the word whole, there is a corresponding meaning of the word part. Thus we say that a half is part of a whole, because two halves make a whole. We say, too, that a side is part of a diameter, but in a different sense, because no matter how many times a side is taken it does not make a diameter, but is always less than the diameter. Again we say that an angle of contingence is part of a right angle because there is an infinite number of angles of contingence in a right angle, and yet when an angle of contingence is subtracted from a right angle a finite number of times the latter becomes smaller. It is in a different sense, however, that a point is said to be part of a line in which it is contained an infinite number of times, for when a point is taken away from a line a finite number of times this does not shorten the line.

It would be a while before such geometrical and mathematical conundra would be clarified, let alone resolved.

Meric Casaubon



Let me move forward a few hundred years to introduce, at some length, a Canterbury Cathedral cleric whose life partly overlapped with that of Isaac Newton and the founding of the Royal Society, and whose work has

relevance for how we might think further about relations between science and belief. The figure is Meric Casaubon who was born in 1559 and died in 1671, just as Newton, as the new Lucasian Professor of Mathematics at Cambridge, was delivering his first lectures on optics which were finally to replace Pecham's *Perspectiva*. As with the discussion of iconoclasm, my treatment will be partly carried by quotations.

It's appropriate therefore to begin by quoting a passage which will resonate for any writer or academic. In a 'Note to the Reader' in the 1668 edition of his book *On Credulity and Incredulity* Casaubon remarks:

> It hath been my case, ever since I came out of that languishing extremity, which affected my spirits most; that my body has continued very weak, . . So that it is but some part of the day, when at best, that I can converse with books; seldom so well, that I can walk, or stand upon my legs: and when once set in my study to write, or to meditate, it is irksome to me, to rise upon any occasion; and therefore I avoid it, without there be some great necessity: much more tedious and irksome, and not without danger, to reach books, which I cannot reach (a great part of my books) without climbing; nor always find, very readily, though ranged and ordered with care, when I seek them. This is the cause, that my quotations are not always so full, or so punctual, as otherwise they might have been. But for the truth of them, which I think is the main business, I durst undertake. . . And if I might advise, I would not have any man take upon him the name of scholar that will trust any quotations, if he may go to the originals; nor trust any translation, if he can understand the authors in their own tongue: which if more practised, good books would be in more request.

As with the rueful comment quoted from Gostling earlier, these remarks resonate sympathetically with an arthritic eighty-year-old retired academic. Perhaps misleadingly so, since the Casaubon conjured up in that passage was once, when he began his writing career, a youthful and rather dashing figure.

Let me nevertheless quote Meric**'s** gravestone in Canterbury Cathedral, where he was buried in 1671. The original Latin reads:

Sta et Venerare Viator.
Hic Mortale Immortalis Spiritus exuvias deposuit MERICUS CASAUBONUS
Magni Nominis
Eruditique Generis
par haeres
Quippe qui
Patrem Isaacum Casaubonum
Avum Henricum Stephanum
Proavum Robertum Stephanum habuit

Hui quos Viros! Quae literarum lumina! Quae aevi sui decora!

Roughly translated:

Pause traveller and pay reverence !
Here lies Meric Casaubon divested of the mortal remains of his immortal spirit
the heir of a great name and a learned race
his father Isaac Casaubon
his grandfather Henry Stephens
his great grandfather Robert Stephens.

Oh what men! What beacons of learning! What ornaments of their age!

The phrase '*Hui quos viros!*' might also be rendered 'alas, what men!' It perhaps indicates a recent cultural shift that this gravestone with its memorable epitaph has been removed from its original location in the south-west transept, facing the great royal window, and is now exposed to the weather in an exterior area almost inaccessibly tucked away behind the cathedral Treasury building. Alas! Meric Casaubon seems no longer an honoured ornament – even though it is his portrait which once also looked down, largely unregarded, upon the reading room of the cathedral library.

The names of Henry and Robert Stephens in the epitaph might still have some resonance, in the form of 'Stephanus' or 'Estienne', since books published under their prestigious imprints in the later sixteenth and early seventeenth century are now regarded as rare and valuable collectors' items, even if their impressive content is no longer the attraction for bibliophile collectors. The Stephanus publishing house, along with those of Aldus and Plantin, typified the printed output of late Renaissance humanism, above all the scholarly editing of Greek and Latin classics. Meric's mother, Florence, was the daughter of Henri Estienne, and his full name was Meric Florence Estienne Casaubon.

Meric's father, Isaac Casaubon, had been born in Geneva in 1559, of French Protestant refugee parents. After the 1561 edict the family was able to return to France, and Arnold Casaubon, Isaac's father, became minister of a Huguenot congregation. At nineteen Isaac was sent to the Academy of Geneva, where he read Greek under Francis Portus, who died in 1581, recommending Isaac, then only twenty-two, as his successor. His subsequent career as a classical philologist established Isaac Casaubon as one of the major figures in standard histories of classical scholarship. He was the subject of an enduring biography by Mark Pattison and lent his name, most unfairly, to the dismal figure of Dorothea's husband in George Eliot's novel *Middlemarch*. One has to assume that the real Isaac Casaubon's marriage to his second wife Florence Estienne was not wholly similar to Dorothea's. Meric was, after all, the tenth of seventeen children.

Despite this auspicious ancestry, not very much has been written about Meric Casaubon himself. There was one book published in 1980 on his attitude to the Royal Society, Michael R. G. Spiller's '*Concerning Natural Experimental Philosophie': Meric Casaubon and the Royal Society*, a 20-page introduction to a 1970 reprint of Casaubon's *A Treatise Concerning Enthusiasme*, and a 70-page introduction by Richard Serjeantson to his edition in 1999 of an unpublished extended letter by Casaubon, entitled by the editor *Generall Learning*.

However, two of his publications, neither of his own authorship, have remained more or less regularly in print. His translation of Marcus Aurelius was long available as the Everyman edition of the *Meditations,* and his edition of John Dee's extra-ordinary diary, *A True And Faithful Relation Of What Passed For Many Years Between Doctor John Dee And Some Spirits* has been regularly reprinted in various formats, engendering some confusion as to Meric's own sceptical attitude to Dee. In addition, some literary scholars have traced Jonathan Swift's possible debts to Meric's 1655 *Treatise concerning Enthusiasme* and his connection with the quarrel often referred to as 'Ancients Versus Moderns', the subject of Swift's *The Battle of the Books*.

One text by Meric Casaubon which occasionally features in histories of 17th-century English science is his 1669 *Letter to Peter du Moulin* partly concerning the Royal Society, which is the focus of Spiller's book, and some scholars briefly mention him in that context. In some accounts, Meric Casaubon is presented as a traditional, even reactionary, defender of 'humane learning' and cursorily dismissed as anti-science and a believer in witches. Spiller's more judicious study includes detailed accounts of Casaubon in relation to several other writers in the various controversies over the Royal Society and the emergence of 'experimental philosophy'. In some references to Casaubon there are echoes of 20th-century conflicts over the threat to humanities disciplines in British universities, including lamentations for the loss of classical scholarship. I want to suggest an alternative framework for considering Meric Casaubon's work, by tracing a rather different line or emphasis in his writings.

natural experimental philosophie

The full title of the published letter considered by Spiller was: *A Letter Of Meric Casaubon D.D. &c. To Peter du Moulin D.D. and Prebendarie of the same Church: Concerning Natural experimental Philosophie, and some books lately set out about it.* Meric, as a scion of the Estiennes, would have been exasperated that the title page was garbled by the printer. The abbreviated *&c.* should presumably have read: 'Meric Casaubon D.D., Prependary of Canterbury Cathedral, to Peter du Moulin D.D. and Prebendary of the same Church'.

Meric had been a prependary from 1628, like his father before him, with a salary provided out of the overall cathedral income and with a living also assigned to him, initially that of the parish of Minster. By 1669, the date of

the letter, Casaubon held the living at Ickham, near Canterbury, and did not live within the cathedral precinct itself. The characteristically personal and convoluted opening of the *Letter* probably recalls a visit to Cambridge (all my quotations from Casaubon are mildly modernised):

> Honoured Brother, You have not forgotten, I dare say, (it is not so long since) where and when you were pleased to bestow a Visit upon me, two young Universitie men being then with me; and you came with a book in your hand, and delivered it to me with a smiling countenance, which, as soon as I had opened the book, I did interpret, having already contested with you more than once about the same matter, as though by it you hoped to stop my mouth for ever. I cannot say you did intend it so really: but so I did interpret it then; but it did fall out much otherwise. For after I had opened it, by the very Title of it, I was much confirmed in my former opinion, and professed it so to you, which occasioned much discourse between us until I was weary, and (as my condition is now) somewhat spent. Ever since that, what I now write, hath been in my mind, and I have had thoughts to impart it to you long before, though still somewhat hath diverted me.
>
> The matter in agitation between us (I need not tell you, I know) was: whether this way of Philosophy, of late years much cried up in London and elsewhere, was, as set out by some, more likely to prove advantageous, or prejudicial, if not destructive, to good learning: by which I mean, (not excluding natural Philosophy) what in former ages of the world, and by many to this day (by you also I make no question) hath been and is accounted true, solid, useful learning: which hath been cherished and countenanced by Kings and Princes and Publick States, in their generations, in all places of Europe hitherto; and hath gotten credit and admiration to the Owners and Professours of it during their lives, and after their death, immortal fame.

It is a characteristically convoluted style, prone to parentheses, which some will find quaint and others tiresome. Certainly, it requires patience. Meric was after all a near contemporary of Robert Burton author of the prolix but entertaining *The Anatomy Of Melancholy.*

The book in question, the main target of the *Letter*, was written by Joseph Glanvill, author of *The Vanity of Dogmatizing*, and had been published in 1668, entitled:

> *Plus ultra, or, The progress and advancement of knowledge since the days of Aristotle in an account of some of the most remarkable late improvements of practical, useful learning, to encourage philosophical endeavours : occasioned by a conference with one of the notional way . .*

Commenting on the title of Glanvill's work, Casaubon expressed his indignation at its claims:

> I observed there, 'Practical useful learning', appropriated to the way now in use, by experiments: and those that go any other way, and follow other studies, which have been formerly in request, styled, men of 'the Notional way'. By 'Practical useful learning', Chymistry and the Mathematicks, as the Author doth explain himself, are also comprehended; whatsoever is besides, so far as I can understand by the book, is proscribed, as useless, notional and unprofitable.

Two other targets in the *Letter* are Thomas Sprat's *History of the Royal Society*, published 1667, and the lesser-known John Dury's *The Reformed Schoole*, originally published in 1649, on which Casaubon comments that it

> cries down all other studies and learning, ordinarily comprehended under the title of *humane learning,* to be but *umbratick* things, *verbal* things, of little or no use, since this new light of *true real Knowledge* especially.

Casaubon's general counter-argument to the vaunting claims made for 'Natural experimental Philosophie' is fairly predictable:

> Man doth consist of two chief parts, the body and a soul, whereof the soul [is] the more noble and more considerable part. . . Those men therefore, who have applied themselves by their writings to promote vertue and godliness, in their kind, (that is, so far as God was known to them) were generally thought to have deserved of mankind, as well (if not better) as the most renowned inventours, or promoters of useful Arts or Trades.

As for Glanvill's 'advancement of knowledge since the days of Aristotle' Casaubon emphatically defends Aristotle against what he scornfully sees as Glanvill's glaringly inadequate knowledge of the range of Aristotle's *oeuvre*:

> I wonder that any, who can pretend ever to have look'd into *Aristotle,* can entertain such fancies for real truth.

Meric's father Isaac had produced an impressive edition of the complete works of Aristotle in 1590, now a 'collector's item'. Perhaps appropriately, an antiquarian bookseller's recent catalogue makes the claim:

> *Operum Aristotelis Stagiritae Philosophorum Omnium Longe Principis, Nova Editio Graece & Latine* : Lugduni : Apud Iacobum Bubonium [Lyon] (1590). First Edition. Casaubon's *Operum Aristotelis Stagiritae* (1590) was the first Greek and Latin edition of the entire works (*opera omnia*) of

> Aristotle. Casaubon's edition was reprinted four times, and his text would be the standard until the late 18th century.

My own copy is the thankfully rather cheaper edition published in Geneva, 1605. Meric would most certainly have done more than 'look'd into' Aristotle.

But by 1669, he implies, seriously working through 1400 pages of double-column Greek and Latin would have been considered unnecessary or outmoded by Glanvill's allies and admirers. Meric selects a passage in Dury:

> 'Whatsoever in the teaching of tongues doth not tend to make them an help to traditional knowledge by the manifestation of real truths in sciences, is superfluous, and not to be insisted upon, especially towards children: whence followeth that the curious study of Criticisms and observation of styles in Authors, and of strains of wit, which speak nothing of reality in sciences, are to be left to such as delight in Vanities more then in Truths.'

Meric caustically comments :

> Truth and Reality and Sciences; brave words are they not to work upon them, who either want will or wit to search into the bottom of things, where in very deed, instead of deeds and realities nothing will be found but words? Such is his conceit, that boys and children must be taught things, before they be taught words or languages.

The satirical account of the Academy of Laputa in *Gulliver's Travels* beckons. In fact, Casaubon is unfair : Dury's curriculum has his students not only reading Greek and Latin classics but conducting their daily conversations in Latin.

But what particularly irks Casaubon is the dismissal of allegedly merely 'notional' inquiries, such as Scholastic disputations in theology. He quotes a passage from Thomas Sprat concerning mediaeval philosophers:

> 'And yet I should not doubt . . to prove, that even in Divinity itself, they are not so necessary, as they are reputed to be; and that all, or most of our religious controversies, may be as well decided by plain reason, and by considerations which may be fetched from the religion of mankind, the nature of government and humane society, and Scripture itself, as by the multitude of Authorities and subtilties of Disputes, which have been heretofore in use . .'

Casaubon registers his ironic incredulity:

> This I do not understand. According to ordinary construction, the sense is obvious enough; but a sense so amazing, that it is not credible.

What is at stake (a decade after the end of the Civil War) is the notion that controversial issues in theology and religion can simply be settled by 'plain reason' or common sense, and at least implicitly that the validity of different versions of Christian belief can somehow be assessed according to the norms of 'experimental science'. Casaubon resists this new 'Reformation':

> God bless the Universities, and University-Libraries, from such Reformers! . . who do so magnifie this study [experimental philosophy], as though there were no other wisdom in the world to be thought of, or pursued after; that make it the onely *useful,* true, solid learning, to which they would have all Schools and Universities fitted,

It is not, Meric emphasises, that he wants himself to dismiss or exclude 'natural philosophy' :

> Nothing hath been said to impair the credit or usefulness of *Natural* or *Experimental* Philosophy: but that we would not allow it to usurp upon all other learning, as not considerable in comparison. Now I crave leave to tell you, that it is (as all good things, more or less) very apt to be abused and to degenerate into *Atheism.* Men that are much fixed upon matter and secondary causes and sensual objects, if great care be not taken, may in time, (there be many examples) and by degrees forget that there be such things in the world as *Spirits,* substances really existing and of great power, though not visible, or palpable by their nature; forget I say, and consequently discredit *supernatural operations:* and at last, that there is a God, and that their souls are immortal. This is a great precipice; and the contempt of all other learning an ill presage.

Casaubon can be regarded as merely anticipating later contests between religious belief and 'scientific materialism', or as a typical example of the humanities scholar complaining about being displaced by scientific attitudes or bureaucratic managerial priorities in today's universities. But there is a somewhat different framework in which to read the *Letter* and Meric's overall position, which can be suggested by retracing some stages in his life and writings.

vindication

On the title page of his publications Meric sometimes inscribed after his name the letters 'I.F.', rather as later authors might add 'F.R.S'. The initials stood for '*Isaaci filius*', son of Isaac, and it is not surprising that Meric's career was overshadowed by that of his eminent father. Isaacs's life had deeply influenced Meric's from the beginning. Meric was born in Calvinist

Geneva where his father had once been in exile, and Meric was then brought up in France as a member of a Hugenot community, though under the reign of a Catholic King, and finally in 1610 James I invited the renowned Isaac to England with a promise of patronage, and the eleven-year-old Meric followed his father. Isaac accepted a prependary appointment at Canterbury cathedral and Meric was the first child of the Casaubon family to be confirmed into the Church of England. Four years later Isaac died, effectively leaving Meric to the somewhat distant care of the King. By royal favour, Meric attended Eton and then Christ Church, Oxford, where he was awarded a studentship, providing some financial support which lasted till 1626. He proceeded BA in 1618 and MA in 1621.

In 1621 Casaubon published his first book, *Pietas Contra Maledicos Patris Nominis Et Religionis Hostes*, a defence of his father against what he later described as 'the railings & calumnies of some Papist'. In 1624 he published a second defence of Isaac, directed against a work which had been falsely published under his father's name. Meric's *Vindicatio* was issued in Latin, English, and French versions by the king's printer, Robert Barker: the English version was entitled *The Vindication or Defence of Isaac Casaubon, Against Those Impostors that lately published an impious and vnlearned Pamphlet, Intituled The Originall of Idolatries,* &c. *vnder his Name, By Meric Casavbon his Sonne.*

These filial publications earned him renewed patronage from the King, partly because the mis-attributed work was not only a forgery by an 'impudent and ignorant' author but had also pretended to have Royal approval. It had originally been published, in French, a decade before Isaac Casaubon was even born, and Meric argued that nobody with the slightest acquaintance with Isaac's authentic works would have believed for a moment that this 'impious and unlearned' tract was by the formidable scholar. Of the unknown author(s) he complains:

> These are the Men, that with incredible pride and arrogancy despise all Antiquity; that most superciliously contemne the ancient and holy Fathers, that studie all they can how to abrogate and abandon all the ancient Constitutions of the Church; and in the meane while, that arrogate to themselves a power of making what Laws they list, of appointing Ceremonies at their pleasure, and of bringing in such a discipline, which the Christians of olde never heard of, as if they had been created the only perpetuall Dictators and Governours of the Church of Christ. And though they have no regard at all of any publique tranquillitie, refusing to give way but to the least thing that may make for the peace and unitie of Christians, yet nevertheles they would faine beare up their credit, and for a colour of their bad intents, make us believe they are wondrous zealous men.
> . . A man would verely thinke that here was one, who . . had proclaimed open warre and defiance to all Antiquitie, or one that being

> starke-staring mad with noveltie and fury, would abandon all the ancient Customes and Constitutions of our Forefathers.

At the root of this arrogant ignorance is a perverted form of almost insane self- reliance:

> Never was any man more childishly and fondly in love with his owne fancie, or more bent to his faction. . . A booke which is so full of excessive ignorance and stupiditie, that whereas every thing in it (except a few scraps taken from others) argue a most unlearned writer; there are many things besides, which I wonder how they could come from a man that was sound in his senses: if yet he is to be thought sound in his senses, whom this pestilent madde puritanisme hath once possessed. . . Good God! What a prodigious liberty of lying is here? What fountains of waters, what seas shall be able to wash away the black poison of this most impure calumniator?

This fierce defence of his father introduces a motif which will become prominent in much of Meric's later work: the problem of people believing something which is patently untrue. As it happens, the topic of the spurious publication was the supposed origin of 'idolatry', itself an instance of false beliefs, and the prime accusation by Puritan iconoclasts directed against both Catholic and Anglican practices of alleged 'idolatry'. Meric is concerned not only with the first-order question whether a belief is true or not, but also with the second-order question as to why people can come to believe that other people's beliefs are quite palpably false but their own are not.

The counterfeit *The Originall of Idolatries* not only fraudulently pretends to respect Isaac Casaubon but by falsely attributing the publication to him creates a confusion in the public record. But what was the motivation of the perpetrators of this false publication?

> What purpose they had that were the contrivers of such cousenage, and what should chiefly move them to doe so unworthy an act, many probable coniectures may be made. It is not unlikely that some sculking crafty Puritan came stealing out with it, to trie if hee could doe the Church of *England* a mischiefe. Peradventure one that bare some private grudge against my Father, thought this way to wound his reputation.

The son of Florence Estienne is also concerned with the role of the publishers:

> Or rather, it is most likely that some unletter'd fellow, some sharking companion, lighting vpon an old motheaten Pamphlet, which hee

> thought to be some great treasure, and hard to be come by; and agreeing with a Sordid Bookeseller to get it reprinted; thought it best to put some mans name of note before it, that so their gaines, which they gaped for, might come in the faster by the sale. And this last (howsoever the other two coniectures goe, for there may be more in it then this alone) they that haue had to doe, and enquire into the matter, haue found to bee most certaine and true. . . who would not lament to see what a miserable case we are now adayes brought vnto, when such base fellowes as these, that neuer had any thing to doe with learning, nor honestie neither, shall take vpon them to iudge what Bookes may benefite the people, and deserue to bee published? Unhappy Theologie! which must be made a refuge for Runagates; and, whether shee will or no, be forced to patronize the base service of such dishonest Mountebankes, that doe so shamefully prostitute her to their gaine and filthie lucre.

And what of the readers who would buy such unscrupulous publications?

> The fault whereof, it is a griefe to see, how in a maner it comes from the very people themselves, who having once got it by the end, that there is no small religion in making long discourses, and in ostentation of much reading, gape after such novell Pamphlets as fast as ever the Athenians did after newes. And so no marvile if wee have every day such dry kickses & abortive broods sent us into the world, when there are so many to buy them up as children doe babies and toyes.

One can imagine Meric's reaction to today's social media fake news and conspiracy theories. He would not have been surprised.

middle way

Meric's first vindication, the *Pieta,* was aimed against 'papists'. The second edition attacked 'puritans' and a further theme soon emerges: an emphasis on Isaac's allegiance to the 'middle way' of the Church of England, defined in terms of what Meric calls 'the use and customs of this church':

> Let this be the first Argument of all the rest, to prove, that *Casaubon* neither was, nor could be the Author of this Booke. For who was it that euer reverenced the gray haires of Antiquitie more then hee? Who euer, without iniuring the holy Scriptures, esteemed more highly of the ancient Fathers? And for the Church of England, what should I neede to speake of it, whose Doctrine and Discipline, Rites and Ceremonies hee did so much approove and embrace, that hee could never seeme to himselfe to haue commended and magnified it enough . . all his Workes

> that belong to matters Ecclesiasticall and Divine, have nothing in them, not onely contrary, or averse from the use and customes of this Church.

He quotes from Isaac's diary from 1611:

> Thankes bee to thee, O Lord, that I was this day admitted unto thy Holy Table, and made partaker of the Body and Blood of Christ in the Church of *England,* the Forme of which Administration, having read it over yesterday, I did highly approve and commend above that custome which others use.

Part of Meric's case against the supposed authorship of his father rests upon the false scholarship of the *Originall* concerning the ancient practices of the Christian church, and with characteristic erudition Meric examines several entangled controversies over such 'customs' as the mixing of water and wine in the Eucharist, whether women could baptise, whether oil was to be used at baptism, the keeping of Lent, 'temples that bear the names of Saints', praying towards the East, confirmation of children, the use of the surplus in performance of divine service, the furniture and ornaments of the church, the use of music, vessels of silver, hangings and tapestries, etc., all of which the *Originall* had falsely traced back to pagan or Roman customs. Meric sums up:

> I am ashamed of these follies, whereof the Author himselfe is not ashamed: who though hee were some unlearned Sot, which is as cleere as the light at noone day, yet hee could never haue growne to that height of insolent madnes, but that he came so minded to write, as if hee intended not to seeke out the Trueth, but to oppresse his Adversaries with criminations, true or false, no matter what. For who was ever so mad to say, that *Numa Pompilius* celebrated Masse 700 yeares before Christ was borne? and yet this Scribler affirmes it almost in every page.

use and custome.

Over the next decade or so Meric's scholarly preoccupations increasingly concerned authorial attribution, accuracy of editions, and authenticity of texts, apparent in his work of editing, commenting, and translating. He edited the fourth-century treatise of Optatus of Milevis *On the Donatist Schism* in 1631. His English translation of the *Meditations* of Marcus Aurelius came out in 1634, followed eventually by an edition of the Greek text with his own Latin translation in 1643. In 1634 Meric received the livings of Minster in Thanet and Monkton-cum-Birchington in Kent. In August 1636 he was made Doctor of Divinity at Oxford by order of

Charles I. In 1638 the concerns about 'custom' which had figured in the *Vindication* provided the title for his first significant original publication entitled *A Treatise of Use and Custome.*

In the opening pages Meric says that he is 'not to engage my selfe into these deepe mysteries of profoundest Phylosophy, which may be thought perchance more abstruse then usefull, and admit of variety of opinions.' Rather, the underlying issue he wants to consider is that:

> many men, after no small paines and studie to find out what Truth is; instead of finding what might satisfie them concerning the nature of Truth, begin to doubt whether there be any such thing.

Some might even conclude that truth is:

> nothing else, but meere policie, and private secular interests, [while] many others (of a purer mould or metall, whose meaning is good and sincere:) [see] nothing else, in effect, but meere partialitie, prejudice, presumption, resolute obstinacie, and the like.

Meric proposes to examine what he regards as a main obstacle to arriving at truth:

> I purpose at this time to fixe my contemplation, being one of the chiefest, (if I bee not much mistaken my selfe) of those many things, that cause truth to bee mistaken by men; and that is, Custome. . . That men both in their actions, and in their judgements, are most swaied by custome, hath beene the observation of many wise men of old, and is most apparent by daily experience. . . For the Custome of men, which they live and are guided by, being different according to differences of places and nations; yea so changeable and variable (I speake it of Customes, in point of Right and Justice, as well as of others:) in the same place, as wee see they are in all places: if it shall bee said of all such generally, as of particulars it is commonly by them that are used unto them, that they are rationabiles; will it not hence necessarily follow, that what is right in one place, is in another wrong: what at one time is reason and Truth; at another time is both false and absurd? And what is this, but to make Truth changeable, Proteus like; and appliable to all times and places?

His initial inquiry is not, however, into areas that a modern sociologist or ethnologist might regard as the outcome of social customs. He first examines how regular 'custom' in the sense of practice and dedication can result in extraordinary individual skills, such as the agility (somewhat unexpectedly recorded by 'Saint Chrysostome in his nineteenth *Homilie ad populum Antiochenum*' !) of gymnastic performers, able 'to run upon the

ground, all parts of the body turning circularly, like a wheele: to draw ones selfe up and downe by the motion and agitation of the armes onely, as if it were with wings: . . to cast up divers swords one after another into the aire, and to receive every one by the handle.' From such exhibition or entertainment displays Meric moves to what we might regard as fair-ground or freak-show exploits :

> And doubtlesse it stands with reason that custome may doe much in this kind, as generally in point of eating and drinking: whereof learned Physicians treat at large. Yet that a man should . . in one day (if not at one meal) eate a whole boare, a hundred loaves, one weather [*sic*], and a hogge, as we read of one in Aurelian's time: I dare not adscribe this unto custome onely: no more then, to devoure nettles, thistles, the pith of artichockes, raw and living birds and fishes with their scales and feathers, burning coales and candles, &c. and all these in very great quantitie, as Carew in his Survey of Cornwall, recordeth of one Iohn Size of Cornwall.

He then considers glass-eaters, acts of deliberate sleep deprivation, fabulous horsemanship feats among ancient Britons and Turks, travellers' tales of extra-ordinary strength in archery, classical accounts of boys in Sparta enduring whipping – noting that some of these exploits 'put mee in mind of the ancient Christian Asceticks, of whom no lesse in point of patience, if not more by farre, might bee related.' Meric's miscellany of topics eventually expands from unlikely skills-training for circus performers, to differences in laws regarding children, matrimony, parenting, to suggest that the basis for many localised common beliefs, like extraordinary practices, lies in 'customs' and 'use' – what one is used to, and has been brought up to regard as normal. After extensive reference to travellers' tales and classical sources, he concludes:

> From this mutabilitie and inconstancie of mans will, we may first deduce Varietie of fashions and customes. But secondly, differences of places and times cause difference of fashions and customes; and this of necessitie. For it is not possible for many reasons, that men that live under different climates, should all live after one fashion: nor that the inhabitants of one place (the state of things altering often as it doth:) should alwaies live after one sort. Hence are in different places and Kingdomes, at all times, and in the same places and Kingdomes, by certaine revolutions of times, sometimes longer, sometimes shorter, different fashions, different customes, different lawes.

His final comments cautiously acknowledge that even in the domain of religious belief the influence of 'customs' is considerable and difficult to discount, even in one's own case:

> My conclusion is this, That it is the part of a wise rationall man, as to consider diligently how farre forth custome both in matter of Religion and in other things is considerable, lest hee trouble himselfe and others without cause: So to consider as diligently wherein it is altogether against reason, lest conforming to the vulgar in those things, he himselfe become one of them; that is, a man that is led by custome and not by reason.

There is arguably an echo here of his own family's transitions through a series of different religious 'customs', in Catholic France, Calvinist Switzerland, and the Church of England. There was, it might be noted, a 17th-century Hugenot community in Canterbury which followed their own liturgical 'customs' in the crypt of Canterbury Cathedral, where the black Prince's Chantry been set aside for their 'use'. It still exists.

deceptions

In this survey of widespread differences in 'use and custom', there is the preliminary question of how far we should or can believe in claims made concerning extraordinary skills or strange and unfamiliar social practices, a question which arises even before we attempt to provide any explanation for what is claimed. For Meric the primary evidence has to be textual, the written record:

> Now to make this good that I have said, I must first of all suppose, which I thinke no man will deny, that by bookes especially we come to the knowledge of Truth. Of truth in generall, by bookes especially; in some peculiar objects of Truth, as in matters of Historie we have them only to trust to. And in matter of bookes, the Authors of the bookes, and the times when the Authors lived, is mainely considerable. For accordingly doe we give credite (especially in point of Historie and truth of religion) to the Bookes themselves, more or lesse, for the most part. In many things, this alone, to know the Author of the booke, is enough to decide many controversies.

Yet he is acutely aware of the problematic issues of authenticity and reliable transmission of 'books' and indeed, recalling his father's case, the danger of deliberate falsification.

> But what if the Title deceive us, and some . . idle braine of our age, represent it selfe unto us upon the stage under the gray haires of authenticke antiquitie? Have there not beene such impostors at all times, who have attempted . . to abuse the World with supposititious Titles and Names? What profession so sacred, or so vulgar, that hath

not suffered in all ages, by this kind of men? Divines, Lawyers, Phisicians, Philosophers, Historians, have in all ages complained of them: and in those ages, when by reason of the ignorance of the times, men have not beene able to discover them, what errors and absurdities, both in matter of knowledge and practise, both in the Church and in the Commonwealth, have ensued thereupon, to those that are learned, is not unknowne, I am sure; and I may not so far digresse at this time, to satisfie the ignorant.

Adding a characteristic postscript, Casaubon cannot resist taking 'notice here of a certaine booke, inscribed, *Ethruscarum Antiquitatum Fragmenta*' and offering the first exposure in print of the infamous Etruscan forgeries of Curzio Inghirami as based upon the equally fraudulent Annius of Viterbo.

culture wars

Three years after *Use And Custome* Meric published a short treatise examining one fiercely contested contemporary issue, a dispute about whether the practice of extempore prayer amounted to a legal offence. Archbishop Laud had issued regulations concerning non-scripted prayers by minister or congregation and the dangers of pseudo-inspiration. In his 1641 *Use of Daily Public Prayers, in Three Positions*, Meric provided a lengthy scholarly account of what he argues to have been the mainstream Christian practice. But the problem here was not simply a matter of establishing the accuracy of a textual reading or the validity of an interpretation of a particular term as used in previous controversies over 'prayer', though as always Meric was irresistibly detoured into such micro-disputes. His argument from historical sources not only depends on the notion of an 'authentic' period of early Christian belief and practice, and the authority of certain writers, but also involves the claim that to establish what was once factually the case can provide a basis upon which to decide what such precedents imply or demand for present religious practice.

The tract touches on another current issue: the threatened abolition of cathedrals. In his usual convoluted style, Meric writes, rather forlornly:

> I desire them that shall read this (if any shall) all passion and prejudice laid aside, as becommeth good Christians, to consider, whether the religious use of Cathedrals, where (as by the end of their institution it ought to be: if through abuse, incidentall to best things, it happen to be otherwise any where, authority may look unto that;) publike prayers and supplications, for particular persons, as Princes, and Magistrates; and for all men in generall, of all estates and conditions; for the peace and prosperity both of the Church, and of the Common-weale, with much reverence and devotion are daily offered unto God, may not hence, in part, be inferred. I say in part, because of divers other particulars, that

might be alleged to the same purpose: as for example, Sermons; another mayne part of Gods worship: which I think are more frequent (not to say any thing of the Choice) in Cathedrals, then in any other Churches of the Realme: and God forbid, but it should be so.

In 1641 the practice of offering prayers for the monarch, and the arguments over sermons as against services, referred pretty directly to divisions in Meric's own Canterbury Cathedral, where he was later to deplore the use of the Chapter House as a 'sermon house' in rivalry to the traditional services in the choir and nave. Such issues of ecclesiastical discipline involved not only doctrinal differences but what we might now called 'culture wars'.

In January 1641 contemporary controversies over liturgical customs became a personal matter. His Thanet parishioners submitted a 'Petition to the House of Commons against Dr Meric Casaubon, from the Parish of Minster', which complained that:

> Both the said Doctor and Mr John Picard, Clerke, his Curat at Minster aforesaid, are zealously observant of all innovacions, as bowing and cringeing to the Communion table ; and the Doctor being demaunded why he bowed thereto, aunswered, bycause the Sacrament was there administrede. And, bycause the said parish would not rayle in the Communion table, the said Doctor, at his owne charge, against the parishes consent, rayled it in, and removed the Communion table, and sett it close to the wall, at the east end of the Chancell, altarwise (as your peticioners conceive), and hath cutt and defaced the Chancell in many things; and for his actions gave this reason—that he was the Lord Archbishop of Canterburies cheife Chaplen, and therefore he would shew his Grace his forwardnes in it; and threatend your humble suppliants, that, if they would not come upp to the rayle to receive the Comunion, they should answere it before the Lord Archbishop and the Highe Comission; for feare whereof the greatest part of your peticioners, to the great griefe of their consciences, did goe upp to the rayle to receive. And his said Curat, no lesse zealous and earnest that way, refused to administer the sacrament of the Lord's supper to some of the said parish bycause they would not come upp to the rayle to receive it.

A similar petition was submitted from the parish of Monckton. Meric responded with a dispirited defence:

> Innovations are laid to my charge, remooving of the Communion Table, rayling of it, and bowing. The twoe first I did not, nor was present when they were done. In Mounckton, they were compelled by the Court, without any intermeddling of mine, as will appeare by the

> Records of the Court, and expresse testification of those (if need be) who had a hand in that business. At Minster, I acknowledge, I did more than once perswade them quietly to submit to the Order of the Court in that behalfe, fearing they would be compelled and punished (as in other things commanded hath beene observed) if they refused. Other threatning than this, I never used.

He concluded with the assertion that:

> certainly by my preaching in that verie point of the Sacrament, they could not but know that I am noe wayes inclinable to Poperie, which I hope they will acknowledge.

The case continued until 1643, when parliament ordered that he resign Monkton; he was deprived of his prebendal stall, perhaps even briefly imprisoned, and heavily fined. In 1644 he finally lost his living at Minster as well. His replacement was Richard 'Blue Dick' Culmer, whom we earlier encountered in the iconoclastic assault upon the windows of the Cathedral.

In 1645 Meric published another short treatise, *The originall cause of temporall evils. The opinions of the most ancient heathens concerning it, examined by the sacred Scriptures, and referred unto them, as to the sourse and fountaine from whence they sprang.* Though ostensibly an objective scholarly treatment of the various views upon the nature of evil in the classical and early Christian period, the essay can certainly be read as a personal reflection upon the unfolding events of the civil war and the evils of the time, including his own endangered situation. Not wholly unlike Milton's post-Restoration *Paradise Lost* in this respect, Meric's work tries to provide a explanation of current woes in terms of fundamental theological issues. Meric's conclusion veers between the consolatory and the desperate:

> That as all evil of sin is from man, by the instigation of the Devil; so all evil of punishment is from God, for the amendment of sinners. These two, *malum culpae,* and *malum poenae,* (as they are commonly discerned,) *the evil of sin,* and *the evil of punishment,* (though this latter be not *evil* absolutely, but rather *good,* in regard of the end and consequents of it, as heathens themselves have well acknowledged) being the two springs, from whence not *Illae,* as it is in the Comick, but *omnes lachrymae;* whatsoever *Adams* wretched posterity groaneth under, and through which the very frame of this lower and sublunary world laboureth, doth flow. So that were all that professe Christianity, and consequently, to embrace the Scriptures as divine Oracles, truely and really what they professe; as the resolution of this point would be easie and obvious, so the arguing of it, among Christians, needlesse. But by bookes that of late have been written as well by Protestants as by Papists, it may easily appeare that many among Christians are to be found, who in their

> inward are nothing lesse then what outwardly they professe themselves; yea, and not a few, it should seeme, that dare freely enough professe what they beleeve. *Libertins,* as I take it, is their name in some countries. And besides this, it may further appeare by holy *David,* (or whoever was the composer of the *73.* Psal.) that in time of either publick extraordinary confusion, or private distresse and extremity, it may be the case of a man, religious otherwise and godly, to be at a stand for a while, and to entertaine some doubts.

After the loss of his Kent livings, the Casaubon family sought refuge with a relative of Florence, at the home in West Ashling, Sussex, of William Cawley, later to become one of the regicides. Meric seems to have drafted a never-completed treatise on 'the origins of idolatry', precisely the topic of the text falsely attributed to his father.

He provided a relatively uncontroversial commentary on the Psalms for the collective publication, the Westminster *Annotations* (1645), and in 1646 published *A Discourse Concerning Christ His Incarnation, and Exinanition. As also, concerning the Principles Of Christianity: By way of Introduction,* which again displayed his biblical and patristic learning in providing a kind of indirect rebuttal of what he by then saw as the dangerously extreme views of some of the religious sects which were increasingly influential in the anti-royalist coalition of forces.

Perhaps not surprisingly, during the years of war and the interregnum Meric largely confined himself to safe classical philology, revising his father's edition of Persius (1647), completing Thomas Farnaby's edition of Terence (1651), contributing notes to other scholars' editions of Hierocles (1655), an English translation of Florus (1658), and Epictetus and Cebes (1659).

In 1647 he published *De Verborum Usu*, a survey of the appropriate functions and modes of language in the different practices of theology, law, medicine, politics, philosophy. In 1650 he produced a substantial volume entitled *De Quatuor Linguis* which attempted to argue for the origins of Greek and other European languages in relation to ancient Hebrew, an idiosyncratic and never-completed inquiry now remembered for the 80-page Anglo-Saxon glossary contributed to the volume by William Somner.

Meric's beloved Florence died in February 1652. The same year he was apparently approached by Cromwell himself with an invitation to write a strictly factual history of the civil war, an offer he declined.

enthusiasm

His attitude to current developments was made sufficiently apparent when in 1655 he published a lengthy treatment of the notion of 'enthusiasm', a topic which in effect provided him with an opportunity for indirect

reflections upon what were clearly current political as well as religious issues.

A Treatise Concerning Enthusiasme, As it is an Effect of Nature, but is mistaken by many for either Divine Inspiration, or Diabolical Possession was sufficiently successful to be reprinted in 1656. The emphasis of the title seemed to indicate that all varieties of 'enthusiasm' might have 'natural' explanations, and that to attribute them to divine inspiration or diabolical possession would be mistaken. Yet on what grounds does one discriminate? The opening paragraph formulates the problem in personal terms:

> I have been present sometimes at some discourses, and have lighted also upon some relations, in print, concerning Visions and Revelations, that have happened unto some. I did not apprehend them always, as they seemed unto me to do, that were partakers with me of the same . . Relations, or discourses. But neither was I so confident, that I was in the right, and they in the wrong, as peremptorily to conclude any thing in mine own thoughts: much less so confident, that I could think it needfull, to oppose by words and arguments, what was believed by others, different from mine own opinion. For how indeed should I be confident, that I was in the right, without the diligent examination of severall circumstances, unknown unto me, and as little perchance known unto them that were of another opinion? Without which to conclude of particular cases, by general Rules and Maximes, I knew full well, to be a principal cause of most strifes and confusions, that either disturb the brains, or divide the hearts of men in this world.

The issues of belief based upon 'custom' are clearly in play again, including at least implicitly in Puritan 'enthusiasm'.

Meric's first example is, of course, a published text, but he carefully chooses not a product of the ongoing English religious turmoil but a French Roman Catholic memoir, *The Life of Sister Katharine of Jesus; Nunne of the Order of our Lady, &c.*, published in Paris in 1628. He recounts his supposedly accidental browsing of the book and his puzzled response to the claims made within it concerning Sister Katherine's apparently divine inspiration:

> I did often reason with my self, against my self: That it was as possible, that what I thought reason, and nature, might be but my phansy and opinion; as that what by such, and so many, was judged God, and Religion, should be nothing but Nature, and Superstition: that where the matter was disputable, and liable to error, it was safer to erre with authority, then through singularity. These things and the like I objected to my self: but for all this, the further I read, the more I was unsatisfied and disturbed in mine own thoughts; and could have no rest, until I did resolve, as soon as any good opportunity should offer it self, to make it

> my businesse, so farre as I might by best inquisition, throughly to satisfie my self.

The treatise is lengthy and wide-ranging and Meric presents it as primarily just collecting comparative facts, as Aristotle had done in his surveys of marine life and animals, or his systematic assemblage of previous views on a topic. Though quite obviously dealing with an acutely political topic, Casaubon ostensibly offers his accounts as an impartial or even judicial presentation of evidence, an almost ethnographic or anthropological inquiry:

> Here I meddle not with policy, but nature; nor with evil men so much, as the evil consequence of the ignorance of natural causes, which both good and evil are subject unto. My businesse therefore shall be as by examples of all professions in all ages, to shew how men have been very prone upon some grounds of nature, producing some extraordinary though not supernaturall effects; really, not hypocritically, but yet falsely and erroniously, to deem themselves divinely inspired: so secondly to dig and dive (so farre as may be done with warrantable sobriety) into the deep and dark mysteries of nature, for some reasons, and probable confirmations of such natural operations, falsely deemed supernatural.

Characteristically, he takes the framework for the treatise from a classical authority:

> According to *Plutarch* then, there be five kinds of *Enthusiasms*: Divinatory, Bacchical, (or Corybantical,) Poetical, (under which he comprehends Musical also,) Martial, and Eroticall, or amatorie. All these, besides that kinde of Enthusiasme which proceeds from distemper of body, which both by *Plato* and *Plutarch* is particularly mentioned and excluded.

He circumspectly asserts: 'Of Religious *Enthusiasme*, truly and really religious, nothing will be found here', though his abstract less cautiously notes:

> Politick pretensions to *Enthusiasme,* or Divine Inspiration, very usual in all Ages: But mistaken, through ignorance of natural causes, (our only Subject and aime in this Treatise) as more frequent, so more dangerous. Enthusiastick times and tempers noted by ancient Authors.

The first instances he offers take us back to the motif of 'custom' as the dedicated practice of skills, where apparent cases of inspiration or unusual

powers might simply be due to an enhancement of ordinary senses, as for example a man might have the power of smell found in dog.

> That which I shall first propose to be considered is, that quicknesse and exactnesse of some senses in some dumb creatures, so far exceeding that proportion wherewith nature hath endowed Man. . . But suppose that a man, (as many things happen to men naturally, contrary to the common course of nature,) suppose, I say, that a man, unknown to others, should be born to such a perfection of sense; might not he, by the advantage of reason to boot, do strange things, think we, to the admiration of all men that should not know the cause? As for example, disclose Secrets, which no man would think possible, except he were a Witch; to tell who came to his house, though he saw them not, and from whence; and in a good measure, what should be done in it, by day or by night, though he stirred not from one place? All this, and many such things, by the advantage of that one sense heightned to that perfection, joyned with humane ratiocination and wit, he might do.

Another instance involves deliberately practised compensation for the loss of a sense:

> . . a blind man that was a guide to certain Merchants travelling through the Deserts of *Arabia*. The man rode upon a Camel, and led his company, not by his Eyes, which he had not; but by his Smell, which was so exquisite, that having been acquainted with those wayes before, he could find by the scent of the very earth, nay, of the sand, (which was reached unto him at every mile,) where he was.

Or an explanation might be found in an enhancement by artificial means, as in the once-mysterious capability of communicating at great distances, i.e. by writing, before writing was generally known

> I would have any man to consider with himself, if at such a time, some two or three that had been acquainted with the use of reading and writing had appeared, and made publick shew (yet concealing purposely the mystery of it, to beget admiration,) of their Art, by communicating with one another at a great distance (as now is ordinary) by the mediation of written papers, which should contain particulars of the present condition of each place, what is done, what hath happened, &c. who can think otherwise, but that either the men would have been judged more then men, that could see and know at such a distance; or at least, the papers that brought intelligence unto them, to be some kind of Angel or Devils?

One thinks of early adopters of smart phones. He considers evidence of believable instances of speaking in tongues recorded by reputable writers and the possibility of natural explanations for fits and prophesying, possibly related to melancholic mania.

The recounted examples of disparate forms of enthusiasm accumulate to some 300 pages. Some comparisons might be made with Thomas Browne's *Pseudodoxia Epidemica* or even Robert Burton's *Anatomy of Melancholy*. Meric states explicitly that he is content to leave some explanations to medical doctors. But crucially for him, and significantly for what must surely be regarded as an oblique commentary on contemporary events, the action of the Devil remains, Meric insists, a possible 'natural' explanation, applicable to some manifestations of self- deceiving 'enthusiasm'.

After Florence's death Meric lodged in Cotton House in Westminster at the invitation of John Cotton, grandson of Sir Robert Cotton. This gave him constant access to the resources of the Cotton Library. Perhaps in gratitude for this timely hospitality Meric somewhat reluctantly undertook to edit John Dee's bizarre *Conversations with Spirits*, which he published in 1659. From collecting numerous example of peculiar practices and dubious beliefs, Meric now highlighted one spectacular instance.

John Dee had once been renowned as a mathematician, author of a preface to Euclid, specialist in navigation, experimental alchemist. But he had also kept a record for several years of apparent angelic communications and manifestations as transmitted through Dee's companion Edward Kelley. Either these spirit phenomena were genuine, or Kelley was a charlatan, and Dee himself was either collusive or duped. The diary in Casaubon's published version, runs to nearly 500 pages of small print and the sheer scale and intricate detail of the extraordinary operation made it difficult to explain even as a deliberately fraudulent exercise. It raised questions of how far Dee himself, or even Kelley, believed in these apparitions, but also posed the issue of belief for Casaubon himself, who accepted in general the reality of angels and spirits.

In his Preface Meric spells out a possible position:

> [Dee's] only (but great and dreadful) error [was] that he mistook false lying Spirits for Angels of Light , the Devil of Hell (as we commonly term him) for the God of Heaven. For the Truth then, and Sincerity or Reality of the Relation in this sense, I shall first appeal to the Book itself. I know it is the fashion of many (I will not say that I never did it myself) that are buyers of books, they will turn five or six leaves, if they happen upon somewhat that pleases their fancy, the book is a good book, and when they have bought it, it concerneth them to think so, because they have paid for it: but on the other side, if they light upon somewhat that does not please (which may happen in the best) they are as ready to condemn and cast away.

It is very possible that some such buyer lighting upon this, and in it, upon some places here and there, where some odd uncouth things may offer themselves, things ridiculous, incredible to ordinary sense and construction, he may be ready to judge of the whole accordingly. But for all this, I will in the first place appeal to the book itself; but with this respect to the Reader, that he will have the patience to read in order one fourth part of the book at least before he judge; and if by that time he be not convicted, he shall have my good will to give it over. Not but that all the rest, even to the end, does help very well to confirm the truth and reality of the whole Story: but because I think there is so much in any fourth part, if diligently read, and with due consideration, that I despair of his assent, that is not convicted by it. . .

Dr. Dee in all this Relation did deal with all simplicity and sincerity. I shall only add, that whereas I used the word Reality before, concerning those things that appeared, according to this Relation: I would not be mistaken, as though I intended that whatsoever the Devil did seem to do or represent, it was Really and Substantially as it seemed and appeared, that would be a great and gross mistake. The very word Apparition does rather import the contrary. All I understand by Reality, it is, that what things appeared, they did so appear by the power and operation of Spirits, actually present and working, and were not the effects of a depraved fantasy and imagination by mere natural causes. By which, strange things, I confess, may be presented and apprehended too, sometimes by the parties with all confidence, as we said before, though all be but fancy and imagination.

more controversies

After the Restoration in 1660, Casaubon recovered his prebendary stall in Canterbury Cathedral, and his living at Minster, though he exchanged Minster for Ickham in 1662. His only published sermon appeared in 1660, a reissue of a sermon he had preached in the Cathedral in 1643, rather bizarrely interpreting Old Testament passages in terms of then-contemporary and now allegedly resolved political conflicts.

In these changed and more secure circumstances Meric engaged more directly with current controversial issues, publishing in 1660 a *Vindication of the Lord's Prayer* and in 1663 *The Question, to whom it Belonged Anciently to Preach* concerning the Archbishop of Canterbury's directive against unlicensed preachers and restricting permission to preach publicly – almost a variation on the old issue of extempore prayer. As usual, Casaubon surveys the historical record of what used to be the case at various periods indicating who was licensed, authorised, or allowed to preach. He cites an impressive range of patristic authorities but explicitly recognises that there is a division in the record and that authorities can be cited in support of

various positions. In some instances inconclusive or even contradictory evidence can be found within a single text.

Again, what is partly at stake is the process of identifying, authenticating, and correcting texts which may themselves incorporate partial counterfeiting or otherwise dubious textual transmission and translation, but the problem is not simply to establish what in fact was the case, but whether we should abide by the 'customs' which used to obtain, operating as a law to be followed, not just a precedent to be recorded.

However, his focus shifts in the final pages of the pamphlet as he urgently concerns himself not just with the issue of who preaches but also with how they preach:

> I do not deny but ardent and vehement speech is generally most plausible and powerful: yet I find that some accounted learned and judicious have avoided it, as having too much affinity with madness and distraction. Wise men are apt to suspect any thing that is accompanied with passion, as knowing that passion and reason seldom go together, and that a calm temper of the mind, is the best temper, for the discovery of the truth. Neither is that, which is most popular, and plausible, always the most profitable.

The grave danger is what 'the Puritans and Precisians of England' have done by

> Appropriating . . that sacred title of God's Word to their own Pulpit Preaching. Which also they will often call the Gospel and without any limitation, whereby people (deluded silly people) are brought to believe that there is no other Gospel but what is preached out of pulpits: and in case any of that party . . be prohibited to preach, that the Gospel doth suffer thereby and is in danger.

We may again be reminded of more recent phenomena when Casaubon speaks of 'the extemporary prattlings of illiterate Fanatics and Enthusiasts' practised for their own 'honour and reputation, but for their profit too'.

In *Of the Necessity of a Reformation in and before Luther's time* published in 1664, Meric renewed his polemic also against Catholic positions, replicating much of the method and content of his father Isaac Casaubon's once well-known *Letter to Cardinal Perron*, essentially an argument about the authentic history of Christianity, and more specifically as a philologist undertaking to establish precisely the correct formulations deployed in various disputed authorities, which characteristically leads Meric into detailed comparison of texts, editions, and translations. He acknowledges a degree of residual uncertainty as of less significance in relation to the text of Greek or Latin classics but having decisive consequences in the realm of religious observance and theological doctrine.

In addition, Casaubon published in 1665 a blistering attack on a Catholic appeal to the necessity for an infallible doctrinal authority

> *To J.S., the author of Sure-footing, his letter, lately published, The answer of Mer. Casaubon, D.D., concerning the new way of infallibility lately devised to uphold the Roman cause, the Holy Scriptures, antient fathers and councills laid aside.*

Meric's response begins with some old motifs:

> I have naturally a great antipathy to *Fanaticks* and *Fanatick* opinions. I look upon them, as the great enemies of mankind; that is, of true religion, and civil government. You know what this Kingdome hath lately suffered by them, and how neer it came to utter destruction.

And he continues with an indignation we can recognise from the letter to Peter du Moulin:

> Thirdly and lastly, your *Science, certain sense, self-evidence, intrinsecal mediums, connexion of causes, demonstration, principles of Nature,* and the like; which you inculcate in every page, as though *science* and *demonstration* were *meat* and *drink* and *sleep* to you, and you lived by nothing else; Whereas (let me be accounted mad, I am willing, if it be not true:) all that you ground upon; your principles; (as you apply them:) your reasons, your consequences, are so ridiculous, and childish, and senseless, that a man may with as much probability undertake to reduce all Story, all Truth, all Religion, to *Esops* Fables; as to reconcile your Doctrine to Sense and Reason.

This minor pamphlet does however include an account of how Casaubon came to edit what he here calls '*Dr. Dee's tedious Legend about his Spirits*'.

credulity and incredulity

By this point, even a patient reader might feel justified in complaining that, Casaubon-like, I have been indulging in a mere resurrection of a forgotten scholar and writer. Meric and his miscellaneous *oeuvre* might be regarded as summoning up, if not John Dee's spurious angels, at best a marginal and insignificant structure of sensibility, and there is no longer even a noble tomb to celebrate but just a shelf of unread books. What has all this to do with Pecham's philosophy and geometry or the subsequent history of either science or religion in the 17th century? However, indulge me and Meric just a little longer.

In 1668 Casaubon published the first two parts of *Of Credulity and Incredulity, in Things Natural, Civil, and Divine*, *wherein, among other things, the Sadducism of these times, in denying Spirits, Witches and Supernatural Operations, by*

pregnant instances and evidences, is fully confuted. A characteristic title. Here the method and concerns of both *Use and Custom* and the *Treatise On Enthusiasm* are combined, expanded and elaborated. The volume can be read as almost a culmination of his overall oeuvre, and Meric himself acknowledges this with references back to his previous publications:

> That I had such a subject in my thoughts, many years ago, may appear by somewhat I did write in the *Preface* to Doctor Dee's book; and then, indeed, I was big with it, had time, and opportunity served.

He has now found his overarching topic:

> For *Credulity,* and *Incredulity,* in general, being my Theme, which left me to a liberty of chusing fit instances, where I would, so that upon them I might but ground such rules and directions for either, as might be proper to my undertaking; I have endeavoured to pitch upon such, as might afford somewhat against the crying evils of these times, *contempt of good learning*, and *Atheism*.

The issue is central and pervasive:

> There's scarce any thing, wherein men either more frequently erre, or with more danger, than in *unadvised belief, or unbelief.*

And the danger is now imminent:

> From ungrounded belief, gross superstition, by which true Religion is not a little infected, and adulterated, hath proceeded: but, from the contrary, right down [to] *Atheism* (whether openly professed, or palliated, as the fashion is).

Much of the 1668 volume is characteristically taken up with the citing of textual authorities, as even in this initial formulation of the issue:

> On the one side stands the credit and authority of so many ages, which commend that of Epicharmus unto us, [as] translated by Cicero: *Nervi, atque artus sapientiae, non temere credere,* that is, *Not easily to trust*, (or, *to believe) are the very nerves and sinews of wisdom*. On the other, *Non satis credere, want of faith*, or *belief*, *is the original of all misery* (so Seneca, a wise man too, though not so ancient:) and one of no less credit, and antiquity, (some few years abated) than Epicharmus, hath told us long ago (his very words, recorded by Plutarch; cited by Clemens Alexandrinus*),* that . . *infidelity*, or *want of faith*, *is the cause, that God and his works are not better known unto men*.

In his usual crepuscular style Meric attempts to clarify his core terms, including the Greek term, **πιστις** , familiar from the Greek New Testament:

> *Credulity*, oppos'd to *Incredulity*, may be understood two ways, either as a vertue (for so the word is taken sometimes, by Christian writers, especially;) or both *Credulity* (the most warrantable and ordinary sense of the word) and *Incredulity* may be taken as two vicious extreams, of what we may call **πιστις** in general, taken for a *rational belief*, or *belief* grounded, either upon ordinary grounds of reason, and probability, which begets, *a moral belief*; or upon such pregnant pressing reasons, as produce a firm assent, answerable to certain knowledge, or science, though not science properly, because not grounded upon the knowledge of the causes.
>
> In either sense, *credulity* taken, will fit our purpose well enough: yet of the two, I rather chuse the second, that *credulity* may be taken for a vice; that so, as all, or most vertues, according to *Aristotle's* doctrine, (though by some, upon very light grounds, as I conceive, much opposed) we may place this πιστις, or *belief* also in the middle of two vicious extremities.
>
> . . But I must confess, the business of *incredulity* did more run in my head at this time, because of the times so set upon *Atheism*, which of all kind of *incredulity*, is the most horrible, and damnable, and most unworthy of a rational man.
>
> Now one prime foundation of *Atheism*, as by many ancient, and late, is observed, being the not believing the existence of spiritual essences, whether good, or bad; separate, or united; subordinate to God, as to the supream and original Cause of all; and by consequent, the denying of supernatural operations;

The distinctions he is struggling with are worth disentangling and clarifying for oneself, since it is arguable that the relations between credulity and incredulity, or too much and too little belief, have been central since the 17th century not only in 'religion' and 'science' but in politics and culture more generally. Whether Casaubon's approach is adequate is worth consideration in a world of Internet misinformation and social media conspiracy theories.

As before, Meric embarks on a kind of Aristotelian gathering of numerous empirical examples, compiling over three hundred pages and almost drifting from one attested example to another, often bizarre or exotic. He begins with several reports of 'monsters' which readers might find incredible but which he argues are reliably recorded by eminent and learned authors. At times he almost appears to be providing suitable content for the *Transactions of the Royal Society* which in its early issues also offered instances of anomalous monstrosities.

His next section predictably relates to astrology and alchemy, but he also deploys the terms soon to occur frequently in disputes in the Royal Society concerning the nature of invisible or 'occult' 'forces', not least in later debates over Newton's notion of cosmic 'gravity':

> Another great object of *admiration*, is that which they call *occultae qualitates*; to which some *sympathies* and *antipathies*; as also . . may be referred; but as much more general, than either. . . For my part, I shall not be ashamed to acknowledge my weakness: I have looked into it, with as much candor, and diligence, as in such a case I thought necessary; so far from prejudice, that I would perswade my self, I could not but speed, and find what I sought for: but I have not I profess it; yet with submission, to better judgments. . . To these *occultae qualitates*, we may add, *influxus coelestes*, or *influentiae*; to which I find very learned men, Physicians and others, to ascribe strange effects . . But to our *Coelestes influxus*: though they be granted, yet it is very possible, that many things may be ascribed unto them, which may proceed from other causes.

Characteristically, Meric assembles apparently disparate phenomena, citing his usual erudite range of references, including his most admired post-Aristotelian figure, and his ultimately preferred explanation of possible diabolical influence:

> That some men are lucky at Cards, beyond all imagination, or do feats with them, beyond the limits of any supposed activity, or juggling; such as learned Raguseius doth profess in the presence of some others, men of great worth and fame, whom he doth name (Hieron. Fabritius, ab Aquapendente: Hercules Saxonia, &c.) to have seen, and admired; I should not, though never so much admired, or *incredible*, ascribe to a *Celestial influence*, though I find a very good Author, whom I ever looked upon as a second Aristotle, (the greatest commendation, I think, that can be given to man, Religion laid aside) in point of sound and solid reasoning; even Thomas Aquinas, cited for it, by the same learned Author: whose opinion, in that matter, I much sooner embrace, that such things are done by contract with the Devil.

His old preoccupation with 'use and custom' reappears:

> And yet I have ground to believe, that so much may be done in this kind, by art and cunning; (which things are commonly referred to the power of *use and custom*, which will be our next consideration, after this of *influxes*) so strange and miraculous, in appearance, that a man had need to be very well vers'd in such speculations, before he charge any man. And that is, when the case is so notorious, as no man can

> rationally doubt; as in that pretended Juggler, who (related by divers) before Charles the Ninth, King of France, made the Rings of a gold Chain, *to leap towards him one after another*, who was at a distance; and after that, made the Chain whole again: which, at last, himself confessed to have done by the help of the Devil; for which he was deservedly cast out of the Court, and punished. . . Another great cause of wondring, is the power of *use and custom*: which they, who either by the report of others, creditable witnesses; or by their own experience, have not been acquainted with, and well considered of, must needs ascribe to magick, and supernatural causes many things, which are meerly natural.

Meric finally acknowledges his authorship of the anonymous 1638 publication on *Use and Custom* and explicitly suggests the much wider contexts for his concerns, including the differences in national 'customs', not least religious ones, which he had experienced in his own and his family's various transplantations across the religious landscape of Europe:

> It is possible, the Reader may light upon a book, tituled, *A Treatise of Use and Custom*. It is not in the Title, but might have been added (as here) *in things Natural, Civil, and Divine*. That which gave occasion to it, (for I must own it as mine, though set out, without my name) was: I was at that time much troubled, and as I thought injured, by what, in the law of this Realm, goes under the name of *Custom*; to me, before, little known: and as the business run often in my mind, (riding especially, when I had nothing else to busie my thoughts) it brought in time many things into my mind, which I had read, and observed, concerning *custom*, in general; till at last it came to this, that was printed.

*

I won't provide even a summary of the very considerable number of miscellaneous instances Meric orchestrates, but what emerges is an overall schema of levels or degrees of both 'credulity' and 'incredulity'. Crucially, Meric is not providing a typology of sure and certain knowledge, based upon a systematic epistemology concerned with what we actually know, but rather an attempt to discriminate between the various grounds upon which in practice we make a form of choice between believing and not believing.

The first level or mode is when I have personally witnessed an event or occasion, using my own senses: I have seen or heard or touched something specific, and Meric offers several autobiographical narratives of such occasions. The next level would be when I have witnessed something using an extended version of my own senses, as with a telescope or microscope, but my belief in what I have witnessed then depends partly on my sense of the reliability of the intervening instrument or apparatus. The next level would be where I have directly heard from a witness who himself directly saw or heard the event in question and I trust the reliability of that witness, and perhaps can even interrogate him or her. But if I have only read a

written account from a witness who recorded what they claimed to have seen or heard, this not only reduces the level of appropriate credulity but raises the inevitable Casaubon concern with the reliability of printed texts. If moreover the witness has himself only read some other reputable or learned author concerning the alleged event then my credulity is less and less justified.

However, there may be a reasonable case that a written record witnessing some almost incredible event is to be trusted for external reasons, for example that Josephus would not have risked deliberately misreporting the events he recounts as taking place in the presence of the Imperial Court. That several authors can be cited as having reported similar instances also increases the level of justifiable credulity, even if what is reported remains apparently incredible. If what is alleged to have occurred can itself be repeated, and I might witness it for myself, this contributes to credibility and a corresponding credulity. If a natural explanation can be offered which is preferable to the notion that the event or instance didn't occur at all, this supports my credulity.

If a supernatural explanation is offered my credulity depends on my general belief or otherwise in 'supernatural' explanations, though for Meric the action of the devil can again be regarded as a 'natural' explanation. However, if what is alleged to have occurred could not be directly witnessed because what occurred is reported as invisible then I might distinguish between something intrinsically invisible, as distinct from merely inaccessible to a particular witness, but perhaps able to be made visible to somebody else, who might enjoy an enhanced perception. John Dee's relationship to Kelly would be a case in point. But if something is 'invisible' because it doesn't actually exist or cannot exist, then what remains of interest is why the alleged witness report occurred in the first place.

In trying to delineate the various kinds of account which Meric offers and examines I have to some extent conflated 'credibility' and 'credulity', which reflects a persistent strand in Meric's work as a whole. In his choice of examples Meric is explicitly examining not so much what is 'credible' but rather why it is or could be considered credible and under what circumstances and by whom.

He is not concerned with what is 'scientifically' or 'philosophically' demonstrable, but rather with the factors which can be induced or procedures followed which have apparently justified somebody else's credulity, their belief in something which might – in Meric's own view – nevertheless be false. The distinction is that we think we can normally say either that we know or do not know, whereas in the case of credulity and incredulity we can readily acknowledge degrees of belief and unbelief, recognising that we in part believe, or that we are inclined to believe or disbelieve, but don't even ourselves know which and to what extent.

One might compare Meric's approach with examining the modern phenomenon of 'UFOs', where one might try to explain not what was

allegedly seen but why people believe in a sighting. A similar consideration might apply to current conspiracy theories or social media misinformation.

Pivotal to Meric's own account is why people believe or disbelieve what is written, a concern which moves beyond considering historical accounts and narratives or contemporary anecdotal reportage, to the eventually inescapable question for Meric himself, concerning belief in the text of Scripture. However, this issue is reserved for the third part of the overall treatise and is dealt with by a distinctly different approach in the later volume published in 1670 with the title: *Of Credulity And Incredulity in things Divine & Spiritual wherein (among other things) a true and faithful account is given of the Platonick Philosophy, as it has reference to Christianity: as also the business of Witches and Witchcraft.*

What finally concerns him, though it is never systematically articulated as a hierarchy of criteria, is the basis upon which we might establish the grounds for holding a religious belief. Given the dangers or consequences of both credulity and incredulity, is there a desirable mid-point or Aristotelian mean between the too-gullible and the over-sceptical. Implicitly at least, this involves Meric in deciding the basis for his own beliefs, including his choice between Roman and Protestant versions of Christianity, and even between Christianity and what he sees as atheism. He is also explicitly aware of the contending differences between Christianity and Islam, as evident in his several treatments of the Koran and his youthful attempts to learn sufficient Arabic to read it in the original language. Eventually this will raise the question for Meric of his own belief in the very text of Scripture itself.

His approach, in the separately published third part of *On Credulity and Incredulity*, is not to create a rigorous epistemological method or a logically valid sequence of deduction, but rather to present a chain of more or less plausible grounds for a connected series of beliefs sustaining each other in a kind of circular or accumulative structure of assent. On the basis of what he presents as distinct echoes of the Scriptures found in the oldest classical texts, Meric proposes that the Scriptures must be regarded as the most ancient texts of all, and therefore as endowed with a divinely endorsed status since they have been preserved so astonishingly intact (through the divinely ensured guardianship of the rigorous Jewish transmission of the texts). This endows these texts with a unique authority upon which he can proceed to construct grounds for accepting the beliefs contained in those Scriptures. Essentially this is a variation of the move made by Aquinas in trying to resolve the arguments for and against the eternity of the world by regarding the Bible text as settling the question of 'fact' – which was also, of course, the position adopted by the papal inquisitors of Copernicus and Galileo.

In addition to this construction of a 'grammar of assent' – to use Newman's phrase – Casaubon insists upon a specific and repeated strand in his core argument: that the attested record of the exercise of non-natural

powers by witches is decisive evidence for the existence of a wider category of non-material spirits. Casaubon's explanation of witchcraft, in terms of the intervention of the diabolical, makes it impossible, he thinks, to deny a supernatural dimension and therefore validates belief in the immaterial, including the immortal soul and the divine itself.

For Casaubon such spirits and powers are indeed invisible and it is the restriction of evidence to the materially visible which he fundamentally opposes in the experimental philosophy as propagandised by its supporters. Which is ironic given the claims concerning invisible or 'occult' forces arising from experiments with magnetism and the demonstration in Hooke's *Micrographia* of 1665 that the previously invisible could actually be brought to visibility, even if the magnifications of the microscope seemed to reveal a world populated not so much by invisible 'spirits' but by the kind of monsters (albeit minutely small) which might once have figured in Meric's catalogue of the unbelievable.

false facts

We can now at last return to the 1669 *Letter to Peter du Moulin* and situate it in this overall context. To do so, we can first leave Casaubon himself for a moment and consider a more general framework, taking us back partly to John Pecham. Very schematically indeed. Pecham's 13th-century curriculum was mainly devoted to the Scriptures, and most of the writings produced by figures such as Aquinas consisted of commentaries on books of the Bible, though it is their philosophical works which are mainly regarded today. At the same time, there was an attempt to assimilate the impact of the newly emergent Aristotle texts including those on physics and logic, a significantly different encounter from previous Christian engagements with what was known of Plato's philosophy. Plato had been fairly unproblematically interpreted as supporting a form of philosophy sympathetic to such Christian positions as the immortality of the soul and the existence of God. Though Aristotle could also be appropriated in support of such positions, the bulk of the Aristotelian corpus as it gradually emerged concerned a far larger range of inquiries.

Aristotle's characteristic approach was not only to survey systematically the views of his philosophical predecessors, in order to investigate how they might be reconciled or superseded, but also to assemble the findings of extensive empirical inquiries, as in the *Historia Animalium, De Partibus Animalium Generatione et Corruptione, Meteorologica,* and so on. Flanking the entire oeuvre attributed to Aristotle were the works on logic, regarded as the initial ground- work for rational inquiry, and the treatises on metaphysics as the culmination, but texts such as the *Physics* and the *De caelo* also figured prominently, incorporated into what was represented as a single Aristotelian system.

The role of geometrical optics within this overall schema was ambivalent. As we have seen, Pecham's *Perspectiva* included a degree of empirical investigation, while the formal procedure of the treatise was modelled on that of a Euclidean treatise, an ordered sequence of interconnected questions and problems. In this context, as we have seen, the provision of schematic diagrams offered a kind of mediation between physical description and mathematical calculation. Moreover, given that the impact of Aristotle was mediated through Islamic sources, European Christian philosophy and theology confronted, for both defensive and proselytising purposes, the need to engage with not only a non-Christian philosophical tradition in the newly transmitted works of Aristotle and the Arabic philosophers and commentators but also an alternative theological framework and sacred text in Islam itself. Aquinas's *Summa Theologiae* may have been written from within the terms of reference of specifically Christian doctrine but the *Summa Contra Gentiles* indicates a moment at which philosophical arguments were also to be directed outwards from the framework of the Christian faith.

In an equally schematic overview, one could say that the configuration of relations in the 17th-century between science, philosophy, and theology, was markedly different. Arising not least from the telescopic discoveries of Galileo and the geocentric implications of Copernicus and Kepler's work, a new picture of the cosmos demanded a new physics, a more or less systematic replacement for what had been transmitted as Aristotelian theoretical or philosophical physics. In particular, the appeal to what came to be labelled 'experimental philosophy', initially as a range of relatively self-contained enquiries and more or less miscellaneous particular investigations, typified by the amazingly disparate contents of early issues of the *Transactions of the Royal Society*, meant that attempts at a new synthesis led in two problematic directions.

In so far as the techniques of measurement and calculation proved characteristic of the procedures of investigation of natural phenomena, the centrality of mathematics was increasingly affirmed. On the other hand, the claims to have established a range of new discoveries and knowledge prompted an increasing epistemological preoccupation: the question 'what do we now know?' or 'how do we know it?' And eventually the subtler second-order question: 'How do we know that we do know what we think we know?' Aristotelian logic was not designed to answer such questions except in so far as the basis of any epistemological position might be regarded as a matter of logic.

While actual experimental investigation and the reporting of a range of increasingly interconnected findings took the form of a loosely collaborative and collective effort, again as typified in the formation of the Royal Society and similar organisations, the temptation in considering epistemological issues was – particularly in the case of Descartes – to regard the individual, especially the individual philosopher, as the locus of attempts to validate the

very nature of understanding: in effect, the assertion or working assumption that the individual mind was where certainty was to be located. This approach characterised such treatises as Descartes's *Discourse on Method* or *Principles of Philosophy* and Locke's *Essay on Human Understanding*, arguably leading directly to the elaboration of problematic epistemologies in Berkeley, Hume, Leibniz, and eventually the impasse of Kant. In that direction lay both the pragmatic position of many working scientists indifferent to metaphysics and content with a kind of procedural materialism, and on the other hand a transcendental or subjective idealism which constructed a peculiarly opaque barrier between the thinking subject and the material object of knowledge, the thing as known to us and as it exists in its own unreachability.

If we now situate Meric Casaubon within this drastically summarised double framework, he was obviously not a working scientist, according to the Royal Society's criteria, still less an epistemologist in the emerging post-Cartesian sense. Nor is he a late Scholastic, despite his Aristotelian allegiances, since clearly his conception of his own Christian position is derived primarily from historical authority, including that of Scripture, and not from any contemporary doctrinal authority. Given his awareness of the role of received 'use and custom', his particular ecclesiastical allegiance was of a primarily liturgical and social character, a matter of accepting a historically founded set of practices rather than any attempted rational reconciliation with received propositional forms of faith.

However, as a skilled and experienced philologist, he also recognised that any appeal to 'history' could be disputed, as vulnerable to misinterpretation and even fraudulent manipulation, while appeal to 'custom' could be highly relative and dependent in particular upon one's national location. Meric's primary question, as it develops over his entire *oeuvre*, is not so much 'what do we know and how do we know it?', but rather 'what do people believe and why do they believe it?' – and to ask if there was a viable balancing point between credulity and incredulity. The emerging refusal or inability to believe Christian dogma associated with post-renaissance philosophical scepticism, and in particular for Meric with the strand of revived Epicureanism or Sadducism, would lead in his view to an atheism or at best to a kind of deism. Or alternatively to a recourse to a kind of secondary belief in papal infallibility. Neither was acceptable to him. The Church of England could perhaps still be regarded as somehow an Aristotelian mean.

So Meric assiduously assembles what are recorded as 'facts' concerning what he regards as 'false' beliefs which people nevertheless endorse and assent to. His investigations are almost as miscellaneous, indeed apparently random, as the disparate contents of several issues of the *Transactions*. He considers not only jugglers, magicians, confidence tricksters, forgers, but the proliferating equivalent in his own day of what we would now regard as the purveyors of fake news, misinformation, and conspiracy theories, composed by ignorant and unqualified but insistently loud-mouthed

spreaders of false claims about history, medicine, and so on, disseminating pseudo-scholarly theories and mis-representations of other people's views and beliefs, whether derived from malice, ignorance, or simple incompetence.

Yet his concern in practice is not so much to dispute the truth of these beliefs, since he largely assumes that his readers will already share his own assessment of the relative scale of their more or less patent falsity, but as in his very first publication to probe the motivations for people believing such falsehoods, no longer at the level of the individual author and publisher of a single work deliberately mis-attributed to his father, but in terms of a kind of collective abandonment of or indifference to received standards of critical judgement and adjudication, a repudiation of traditional ways of testing claims and assertions, most obviously in the case of texts such as the forged Etruscan 'discovery' or positions spuriously attributed to church fathers. The guiding terms for his developing approach include 'use and custom', 'enthusiasm', 'incredulity' and 'credulity'. Our own terms would include 'ideology' and 'the social construction of belief'.

It is within this larger framework as well as his own biography that his *Letter* on the Royal Society can be read. He does not repudiate the actual practice of 'experimental philosophy', if only because as a good Aristotelian he would entirely endorse the collecting of material facts and the critical assessment of their possible causes. His central target is primarily the over-enthusiastic propagandising for the alleged superiority of 'experimental philosophy' over all other forms of learning, investigation, and scholarship and the claim that any other mode or procedure is to be 'proscribed, as useless, notional and unprofitable', a position which he sees as indicating a clear affinity with the enthusiasts and the over-credulous in the several other areas he has explored. His specific target is accordingly Dury, Sprat, and Glanvill, not the Royal Society itself, but, as he emphasises, 'this way of Philosophy, of late years *much cried up in London and elsewhere*'.

The crucial issue for Casaubon is why people believe what he regards as patently incredible, including the very belief that experimental philosophy is the only legitimate form of knowledge. He thus sees the changes in scientific inquiry applauded by Glanvill not primarily in terms of a displacement of the Ancients by the Moderns, or of Aristotle by the Royal Society, but as a matter of understanding the shifting bases of credulity and incredulity.

This concern with false beliefs can be traced back to his first publications against the forgery attributed to his father, and his realisation that it was not just a malicious misattribution but an instance of both corruption and incompetence, akin to the performances of unqualified preachers or the extempore prayers of self-inspired enthusiasts. His analyses ranged from the psychological characteristics underpinning fanatical enthusiasm to the primarily social aspects of 'customs'.

I would not claim that Casaubon thereby foreshadowed the 'social construction of scientific knowledge' approach to the history of science, but in relation to Descartes and the revival of Epicurus his critique is not so much epistemological or methodological but very much to do with the social success of fashionable tendencies even in ostensibly intellectual realms. If both credulity and incredulity (in Casaubon's sense of un-belief) can be accounted for in terms of psychological and social factors, then absolutist claims for both religion and science are implicitly undermined. However, credulity and credibility are not necessarily aligned in either domain and tracing the origins or development of a religious doctrine or a scientific theory does not itself provide criteria for reliably deciding issues of truth.

Casaubon is aware that his own religious position is vulnerable to such an approach, not least in so far as it rested upon an appeal to textual authorities, including the Scriptures. He would have known from his father's unpublished notes that Isaac had intended to write a comparative study of the transmission of the Hebrew Bible and of classical texts, treating both as dependent upon manuscript traditions vulnerable to human error. Meric's fellow-prependary Isaac Vossius was to remark in his edition of Catullus that 'even in all the sacred writers we can notice that when similar or identical words appear, the scribes omit what is found between them. No scholar is unaware of this or denies it. But certain fools and incompetents, who nonetheless want to appear as theologians, do not grant this, and would prefer that the sacred books were immune from corruption. Accordingly, they conjure up imaginary scribes who are holy and never made mistakes' (quoted from Anthony Grafton, *Inky Fingers*, 2020, p. 236).

As a prolific editor himself, Meric was confident that the authentic discipline of historical philological inquiry could establish textual forgeries or false authorial attributions. Such editorial work was the result of 'use and custom' in the other sense of prolonged training and practice. The claims made for laboratory experiment were not of much 'use', for example, in trying to adjudicate on historical authorship (though later scientific scrutiny of physical texts was to be important), but nor does tracing historical beliefs or the history of science resolve epistemological issues.

Nevertheless, validating the authentic writings of an ancient author involved a kind of practical epistemology, not only the slow accumulation of minutely particular considerations, collations and comparisons, but also a form of decisive action or leap of belief beyond the evidence available. In resolving a textual crux the critical editor has no recourse beyond the manuscripts and other material available to him except his own painfully acquired erudition, yet he has still to make a choice as to the authentic reading.

To take an example not available to Casaubon, we now know that to establish the development of Newton's views has required impressive philological devotion and dedicated study of his surviving manuscripts, as in Al Shapiro's work on the *Optics*. Though Casaubon didn't live to see the publication of the *Principia*, he would soon have registered that most people could enthusiastically believe in the Newtonian synthesis even if its credibility rested upon a mathematical method and physical theory which was beyond the comprehension of most of its admirers. John Locke, author of the *Essay on Human Understanding*, admitted to not understanding Newton's mathematics while Samuel Pepys acknowledged barely knowing how to multiply despite himself authorising, on behalf of the Royal Society, the imprimatur of the *Principia*.

Galileo had already recognised in the *Two New Sciences* that it was partly his reputation which persuaded people to accept the validity of his experimental results. The text recounts the famous experiment of the inclined plane and the Aristotelian Simplicio responds:

> It would have given me great satisfaction to been present at these experiments. But being certain of your diligence in making them and your fidelity in relating them, I am content to assume them as most certain and true.

We now know, thanks to Stillman Drake's study of Galileo's worksheets, that Galileo had made his discovery of the laws of motion in a manner quite different from the public presentation he gave of the process in the *Two New Sciences*.

Of course, in these days of anti-science dissemination of fake news around climate change or vaccination, and the social credibility of 'influencers' on social media, the respective media status of, say, David Attenborough or Donald Trump can be decisive for the public relations of science.

While Casaubon dismissed Descartes' much-vaunted 'method' as offering only a spurious shortcut to actual learning, and regarded such figures as Comenius, Dury, and Samuel Hartlib as mere Sophists, his own pedagogical programme as outlined in the long private letter now published as *Generall Learning* insisted that the only 'method' is always to read all the best books. He largely sidesteps philosophical debates except insofar as he considers as intrinsically atheistical any epistemology which outlaws 'invisible' spiritual entities and events, reiterating his own belief in the diabolically manipulated power of witches as demonstrating the presence of such invisible entities, including the 'soul' itself.

He might, however, have responded positively to Descartes's contemporary, Pascal, and his assertion of the fundamental necessity of making a 'wager' upon one's own belief. Perhaps even closer to Meric's own position would have been Frank Ramsey's notion of 'degrees of belief',

though he would not have been sympathetic to the quasi-statistical formulation of Ramsey's argument. While Pascal emphasised a single and enduring bet on the existence of the after-life and the godhead, Ramsey characterised decision-making in conditions of insufficient evidence as akin to estimating the odds on different outcomes, as in betting on a horse race, and thereby instantiating in practice one's own scale of preferred results rather than any objectively positivist calculation. On this analogy, Meric Casaubon in the final part of *Credulity and Incredulity* was betting on a Yankee accumulator, a sequence of runners with the stake carried over and increased after a favourable result in each successive race, with the risk of course of losing any accumulated winnings if the final horse lost.

Meric's commitment to the Church of England, originally due to a change of nationality and language as well as religious affiliation based upon his beloved father's decisions, had involved him in turmoil and trouble, privilege and deprivation, reputation and obscurity. He ended his scholarly career by completing critical editions of Diogenes Laertius (1664) and, as a final tribute to his father, Polybius (1670). Though he never completed the massive refutation of Baronius both he and his father had undertaken. His 1643 Greek edition of Marcus Aurelius has left little scholarly trace, as also his other classical editions and his idiosyncratic writings on language, but the translation of the Aurelius *Meditations* was reprinted in 1634, 1635, 1663 1673, 1692, and eventually adopted and regularly reissued by the Everyman Library.

After Meric's death a posthumous reprint in 1672 of the third part of the *Credulity* treatise was given a new title foregrounding the issue of witches: *A Treatise Proving Spirits, Witches, and Supernatural Operations, By Pregnant Instances and Evidences Together With Other Things Worthy Of Note, by Meric Casaubon*. This deliberately misleading title has given Meric's work a certain after-life in recent scholarly and other attention to the historical phenomenon of witchcraft. But he also deserves some attention for exploring, in his response to the 'new experimental philosophy', an approach which in its emphasis upon 'credulity and incredulity' has been fruitfully developed in more recent studies in the history of science.

With a certain irony, his edition of John Dee has frequently attracted a different kind of attention and contributed to the notion that Meric Casaubon would endorse today's believers in spirits, witches, and 'occult forces'. One suspects that he might have regarded such admirers as modern victims of 'enthusiasm'. Though conscientiously editing the 500 pages of Dee's minutely detailed *A true and faithful relation*, the end of Meric's preface emphasises that 'Doctor Dee's delusion' is a 'warning' concerning 'them that have . . relation unto Devils, as Witches, Wizards, Conjurers, Astrologers, . . Fortune tellers, and the like, yea of all books of that subject.'

The final note in the extensive table of contents, marking the point at which Casaubon stopped editing, records a degree of exhausted exasperation:

> That which follows here, is certainly intended for part of that holy language, which Adam in Paradise is said . . to have spoken: by which great wonders might be wrought. I have neither faith nor curiosity to inquire into it any further: neither will (I think) any sober man.

On that note we can leave Meric Casaubon in his Canterbury resting place and consider a later and very different response to the impact of 'experimental philosophy' or what we now call science.

Whereas Meric Casaubon has always had some minor reputation, the figure I now want to consider has been almost entirely forgotten, but his life and works were sufficiently intriguing, in some respects representative, and probably poignant enough, that he is worth some sympathetic attention. They again raise issues concerning science and belief, and the transmission of both, as well as some philological matters which would have delighted Casaubon.

John Kirkby

Kirkby's connection with Canterbury Cathedral was, unfortunately for him, rather less than he might have hoped, though he was at times resident in Canterbury. His connection with the Royal Society was, one might say, unfortunate.

Indeed his whole life might be regarded as persistently unlucky. One nineteenth-the century summary of his life, in the old *Dictionary of National Biography*, reads:

> Kirkby, John (*c.*1705–1754), Church of England clergyman and grammarian. He was a man of singular ill fortune or bad luck both during his lifetime and in his posthumous reputation or lack of it. He occasionally figures as a minor and sad figure in the life of Edward Gibbon, including Gibbon's autobiography which records that Kirkby was his tutor when Gibbon was only seven. Kirkby, a vicar originally from Cumberland, became tutor to Edward Gibbon in Putney. Unfortunately he lost the post by omitting the name of King George in the morning prayers, thus irritating his patron.

Kirkby is here characterised as a grammarian because one of his works was a *New English Grammar*, published in 1746. Yet even this modest claim to fame has been disputed, by the brief entry on Kirkby in the more recent and almost authoritative *Oxford Dictionary of National Biography* (ODNB):

> While with the Gibbons, Kirkby wrote a grammar of English which, together with a Latin grammar, was published as *A New English Grammar* (1746). The grammar partly plagiarized Anne Fisher's *New Grammar*, which had been published a year earlier in Newcastle. This makes Fisher, not Kirkby, the ancestor of the rule for the use of sex-indefinite 'he'. But unlike Fisher's grammar, Kirkby's was not very popular, for it was never reprinted.

Indeed, if one searches the ambitiously comprehensive Eighteenth Century Collection Online (ECCO) no *New English Grammar* or any combined English and Latin Grammar is attributed to John Kirkby. Though ECCO does include an unattributed *New English Grammar* which at least the British Library catalogue credits to Kirkby – and which seems, to me, not overly dependent upon Anne Fisher's text. Indeed, after downloading and comparing both, the accusation that Kirkby plagiarised Fisher seems hard to sustain.

ECCO does attribute several other texts to Kirkby, including *The Life of Automathes*, of which a print-on-demand copy can even be ordered. It will, however, arrive classified under the category 'Social Sciences', despite the fact that Kirkby's work is plainly a novel, more or less in the mode of *Robinson Crusoe*. Its full title indicates that it was an ambitious philosophical fiction:

> *The Capacity and Extent Of The Human Understanding; Exemplified in the Extraordinary Case Of Automathes; A Young Nobleman, Who Was Accidentally left in his Infancy, upon a Desolate Island, and continued Nineteen Years in that solitary State, separate from all Human Society. A Narrative Abounding with many surprizing Occurrences, both Useful and Entertaining to the Reader.* London : Printed for R. Manby, and H. Shute Cox, on Ludgate-Hill, MDCCXLV.

ECCO lists a second (pirated?) edition a year later, printed in Dublin by George Faulkner in 1746, and another published in London in 1747. There was even a Dutch translation, *Het vermogen en de uitgebreidheid van's menschen verstand, vertoont in't ongemeen geval van Automathes, . .* One might regard that publishing record as a mild success, but Kirkby's ill luck has again pursued him beyond the grave. The *ODNB* once more gravely accuses him of plagiarism:

> Kirkby's plagiarism of Fisher's grammar has gone undetected until very recently; another act of plagiarism was, however, soon discovered. In 1745 he published a novel called *Automathes*, a second edition of which appeared in Dublin a year later. Gibbon describes it as a poor

> performance, and as a plagiarism of well-known romances. It seems largely borrowed from the *History of Autonous* (1736).

It is true that *Automathes* more or less exactly copies large parts of a novel published ten years earlier, with the full title:

> *The History Of Autonous. Containing A Relation how that Young Nobleman was accidentally left alone, in his Infancy, upon a desolate Island; where he lived nineteen Years, remote from all Humane Society, 'till taken up by his Father. With an Account Of his Life, Reflections, and Improvements in Knowledge, during his Continuance in that Solitary State. The Whole, as taken from his own Mouth.*

As a 'variant title' for *Automathes* ECCO includes online this '*History of Autonoçus'* (*sic*) – but the curious spelling mistake makes the title hard to find, and ECCO does not clarify that, contrary also to the *ODNB*'s unkind insinuation, it was actually Kirkby himself who had originally written the *History of Autonóus* in 1736!

His later novel should therefore be regarded as an extensively revised reworking of his own publication, not as a plagiarism of someone else's. Even so, Kirkby's misfortune continues: a print-on-demand copy of the life of the mis-spelt '*Autonoçus*' is even more oddly classified under 'History and Geography', not in the appropriate category 'Literature and Language'.

Thus, any presence in the English fictional canon that poor Kirkby might have enjoyed, perhaps as a minor imitator of Defoe, seems almost irredeemably sabotaged. At least, *Automathes* does appear in a large database of tales which can be regarded as precursors to Edgar Rice Burroughs' *Tarzan* – but it is there listed merely (and inaccurately) as simply a version of the mediaeval Islamic tale *Hayy Ibn Yaqzan*. Few authors can have been so bedevilled by their posthumous commentators. Can justice ever be done? Let us see.

Before considering the actual content of this elusive novel, we can pursue Kirkby's ill-favoured life a little more. The *ODNB* doesn't even credit Kirkby with knowing his own birthplace:

> [he] claimed to have been born in Cumberland, though in the register of St John's College, Cambridge, from where he appears to have graduated BA in 1726, and proceeded MA in 1745, his birthplace is noted as Londesborough, Yorkshire.

Except that the ODNB has, it seems, confused two John Kirkbys. It is at least correct in recording (by copying, or plagiarising, the old *DNB*), that 'in 1739 Kirkby was appointed vicar of Waldershare, Kent, and four years later in 1743 rector of Blackmanstone in Romney Marsh'. And the entry is probably correct in remarking that 'a publication of his that same year on behalf of the poorer clergy at Canterbury is believed to have excluded him

from further preferment' – though the new *ODNB* omits to mention the source given in the old *DNB*, a handwritten note in the British Library copy of the pamphlet.

The title alone probably dented Kirkby's prospects, and that it was published (anonymously) in Canterbury, within sight of the Cathedral, would certainly have precluded any favours, however already unlikely, from the Dean and Chapter:

> *A Demonstration from Christian Principles that the Present Regulation of the Ecclesiastical Revenues in the Church of England, is Directly Contrary and Fatally Destructive to the Design of Christianity. And has A Necessary Tendence to make A Corrupt and Immoral Clergy. By a Clergyman of the same Church.* Canterbury : printed by J. Abree, MDCCXLIII. [1743].

Not the most tactful application for the award of a benefice.

Kirkby was left with his two meagre livings, neither of which can have given him a great deal of satisfaction, or income. Hasted's comprehensive *History and Topographical Survey of the County of Kent* (1799) tells us that the parish of Blackmanstone, 'lying in the level of Romney Marsh', was:

> very small, having no house within it. . . The church was situated close on the other side of the road to it, of which there are only two or three stones remaining. The lands of it are mostly marsh, . . The church has been in ruins for a long time past, and was so in the 26th year of king Henry VIII. . . The king granted it . . To archbishop Cranmer, and it has remained parcel of the see of Canterbury ever since, his grace the archbishop being the present patron of it. It is valued in the king's books at four pounds, and the yearly tenths at eight shillings.

Waldershare might have been just very slightly more attractive. Hasted says:

> In 1588 here were thirty-three communicants. In 1640 there were the like number, and it was valued at thirty-eight pounds. Archbishop Juxon augmented this vicarage twenty pounds per annum, anno 14 King Charles II. There is no vicarage house, and only one acre of glebe land, adjoining to the church-yard; but by the king's books it appears there were formerly two acres. . . The church, which is dedicated to All Saints, is a small mean building, consisting of a body and chancel, having a wooden turret at the west end, in which hangs one bell. It is almost overgrown with ivy.

Both livings were in the gift of the Archbishop of Canterbury. One can perhaps appreciate why Kirkby wrote his pamphlet on ecclesiastical revenues. Anonymously.

A later misfortune in Kirkby's life involved an approach to the Royal Society. In 1748 he published a book entitled *The Doctrine of Ultimators*, and in January 1752 he presented two copies to the Royal Society. A letter accompanying the books was dated from Saint Peter's Street, Canterbury. He wrote that he was hoping to 'establish Weekly Lectures of different Sorts in some Part of London' and suggested that 'it would be no small Advantage to these Purposes, to have the Honour of Subscribing my self one of your Society'. The blatant ploy did not work and Kirkby received only a letter from the Secretary of the Royal Society Thomas Birch with a noncommittal 'I sincerely wish you Success in all your Studies & Labours for the public' (BL, Add. MS 4312, fol. 455, cited in *ODNB*). Three decades later the Royal Institution was established to 'diffuse the knowledge' of science by offering popular lectures, and in 1825 Michael Faraday began the annual Christmas Lectures, a prestigious series which continues today.

Kirkby's series did not have any such success. His hope of realising an income from his proposed 'popular' public lectures may not have been realised at all. He died on 21st May 1754, not yet aged even fifty, with few 'Goods Chattels & Credits' to his impecunious name. And it is somehow characteristic of his posthumous fate that we are not even sure where he died, whether in St. Peters Street, Canterbury, or in the precincts of Norwich Cathedral, the last address indicated in the grant of probate on 10th December 1754.

Gibbon

The old *DNB* was more generous than the new in at least listing, in shortened titles, his 'chief works' as including not only *Automathes* but the following three weightily entitled volumes. The implications of the titles are worth registering.

> *Arithmetical Institutions. Containing a Compleat System of Arithmetic Natural, Logarithmical, and Algebraical in all their Branches: Whereby The Learner is led after an Easy and Familiar Manner from the very first Principles of this kind of Literature to the State unto which it is brought at present: Together With many curious and useful Improvements never before made publick. By the Rev. Mr. John Kirkby.* London : Printed for B. Motte and C. Bathurst, at the Middle Temple-Gate, Fleet-Street; and J. Clark, under the Royal-Exchange, MDCCXXXV. [1735].
>
> *The Impostor Detected; or, the Counterfeit Saint turn'd inside out. Containing a full Discovery of the horrid Blasphemies, and Impieties, taught by those diabolical Seducers called Methodists, under Colour of the only real Christianity. Particularly intended for the Use of the City of Canterbury, where that Mystery of Iniquity has lately begun to work. By John Kirkby, Rector of Blackmanstone in Kent.* London

: Printed for M. Cooper, at the Globe in Pater-Noster Row, MDCCL. [1750].

An Effectual and Easy Demonstration, From Principles purely Philosophical, of the TRUTH of the sacred eternal coequal Trinity of the Godhead; and of the Perfect Inextension of Matter in Space. To which is prefixed, As much extracted from a presumed Improvement of Logic, preparing for the Press; as is necessary to render the Whole of what is here delivered, evident to the Apprehension of the lowest intelligent Reader. By John Kirkby, Rector of Blackmanstone in Kent. London: Printed for M. Cooper, at the Globe in Pater-Noster Row, 1752.

The old *DNB* entry also notes that the treatise on the Trinity included an introduction to a 'New System Of Logic' projected by Kirkby and that 'he also published in 1734 under the title *The Usefulness of Mathematical Learning Explained* a translation from the Latin of the mathematical lectures of Dr Isaac Barrow'.

It also records that Edward Gibbon in fact spoke highly of his Latin and English Grammar. So it is worth quoting the brief entirety of Gibbon's remarks on Kirkby, since what minimal presence in the historical record Kirby might be claimed to have had rested almost entirely upon Gibbon's few paragraphs in his *Memoirs*:

> As soon as the use of speech had prepared my infant reason for the admission of knowledge, I was taught the arts of reading, writing, and arithmetic. So remote is the date, so vague is the memory of their origin in myself, that, were not the error corrected by analogy, I should be tempted to conceive them as innate. In my childhood I was praised for the readiness, with which I could multiply and divide, by memory alone, two sums of several figures: such praise encouraged my growing talent; and had I persevered in this line of application, I might have acquired some fame in mathematical studies.
>
> After this previous institution at home, or at a day-school at Putney, I was delivered at the age of seven into the hands of Mr. John Kirkby, who exercised about eighteen months the office of my domestic tutor. His own words, which I shall here transcribe, inspire in his favour a sentiment of pity and esteem.

Gibbon then quotes the apparently autobiographical opening of *Automathes*, without making it clear that the passage is part of the fictional framing device of a novel:

> —'During my abode in my native county of Cumberland, in quality of an indigent curate, I used now-and-then in a summer, when the pleasantness of the season invited, to take a solitary walk to the sea-shore, which lies about two miles from the town where I lived. Here I

> would amuse myself, once a while in viewing at large the agreeable prospect which surrounded me, and another while (confining my sight to nearer objects) in admiring the vast variety of beautiful shells, thrown upon the beach; some of the choicest of which I always picked up, to divert my little ones upon my return. One time among the rest, taking such a journey in my head, I sat down upon the declivity of the beach with my face to the sea, which was now come up within a few yards of my feet; when immediately the sad thought of the wretched condition of my family, and the unsuccessfulness of all endeavours to amend it, came crowding into my mind, which drove me into a deep melancholy, and ever and anon forced tears from my eyes.'

Gibbon sympathetically continues:

> Distress at last forced him to leave the country. His learning and virtue introduced him to my father; and at Putney he might have found at least a temporary shelter, had not an act of indiscretion again driven him into the world. One day reading prayers in the parish church, he most unluckily forgot the name of King George: his patron, a loyal subject, dismissed him with some reluctance, and a decent reward; and how the poor man ended his days I have never been able to learn. Mr. John Kirkby is the author of two small volumes: the *Life of Automathe*s (London, 1745) and an English and Latin *Grammar* (London, 1746) which, as a testimony of gratitude, he dedicated (November 5th, 1745) to my father. The books are before me: from them the pupil may judge the preceptor; and, upon the whole, his judgment will not be unfavourable; The grammar is executed with accuracy and skill, and I know not whether any better existed at the time in our language.

After this encomium one might appreciate why John Kirkby can be regarded as ineradicably unfortunate. Even Gibbon's account of the crucial incident of dismissal has been misinterpreted. Kirkby did not 'forget the name of the King', as one account has it, but accidentally omitted to include it at the right moment in the service.

Apart from this brutally comical incident, why now remember John Kirkby at all? And in particular why resurrect him and his unsuccessful career in the context of thinking about science as prompted by the tomb of John Pecham?

Mainly because I want to consider two themes in Kirkby's somewhat miscellaneous *oeuvre*. In various ways, he tried to explore the possibility of making mathematics not only 'useful' but accessible, and he attempted in his own highly idiosyncratic way to apply a kind of quasi-mathematical or logical method to a range of disparate issues. He thereby rather curiously anticipated some later developments, not only in his own ambition but also in his perhaps predictable *impasse* and eventual lack of success.

One remark. The diligent reader may already have registered a further connection with the cathedral. The three guide-books discussed much earlier in this meandering essay were published by the Canterbury printers Simmons & Kirkby. It seems that the 'Kirkby' may have been the son of John Kirkby. He had been apprenticed by James Abree (1691?–1768), Canterbury publisher, bookseller, and printer of Canterbury's first newspaper, the *Kentish Post*, founded in 1717. 'At the end of his career, Abree took on an assistant, George Kirkby, son of a Canterbury vicar, who had been apprenticed to the London printer James Bettenham. In 1768, the *Kentish Post* announced that Abree was planning to retire in favour of his assistant Kirkby. A rival paper was started by James Simmons and after a short circulation war, the two newspapers merged as the *Kentish Gazette* which was still being published weekly in Canterbury recently. The firm of Simmons and Kirkby remained in operation for 23 years after Abree's retirement.' Whether George Kirkby was the son of John Kirkby or enjoyed a more lasting success is unclear.

arithmetical institutions

Let us begin unexpectedly. In 1860 Charles Dickens records:

> I lighted upon an advertisement in a daily paper setting forth that the Gresham lectures for this Easter term would be given . . in the theatre of Gresham College in Basinghall Street, in Latin at twelve o'clock and in English at one. . . I presented myself at the Gresham College. A pleasant-faced beadle, gorgeous in blue broad-cloth and gold . . was standing in the hall, and to him I addressed myself, asking where the lecture was to be given. "In the theatre up-stairs sir. Come at one and you'll hear it in English." "Isn't it given in Latin at twelve?" "Lor' bless you, not unless there's three people present, and there never is!"

Charles Dickens would happily have attended the Latin lecture at Gresham. But in 1860 he was in a diminishing minority. The argument for giving the lectures in Latin had originally been to enhance the international standing of the College, as the Ordinances make clear:

> It is very likely that divers strangers of foreign countries, who resorteth thither and understand not the English tongue, will greatly desire to hear the reading of the said Lectures whereby the memory of the said Founder in erecting the said College for the increase of learning may be divulged to the good example of foreign nations and the honour and credit of this honourable City.

We might recall another moment from Bertolt Brecht's *Galileo*, scene 9:

Ludovico: Signor Galilei. You have a wonderful brain. A pity.
The Little Monk amazed: He's threatening you.
Galileo: Yes. I might stir up his peasants into thinking new thoughts. And his servants and his stewards.
Federzoni: How? – None of them reads Latin.
Galileo: I could write for the many in the language of the people, instead of in Latin for the few: For these new ideas we need people who work with their hands. Who else wants to learn about the origins of things? Those who see only the bread on the table don't want to know how it is baked; that lot would rather thank God above than the baker. But those who make the bread will understand that nothing moves which isn't moved. Your sister at the olive-press, Fulganzio, will not be greatly amazed, but will probably laugh when she hears that the sun is not a golden coat of arms but a lever; the earth moves, because the sun moves it.
Ludovico: You will always be the slave of your own infatuations.

Galileo's strategy for fomenting intellectual revolution was a shade optimistic: it took more than translating physics from Latin into the vernacular. Therefore we should perhaps give John Kirkby some credit for at least translating Isaac Barrow's mathematical lectures from Latin into accessible English.

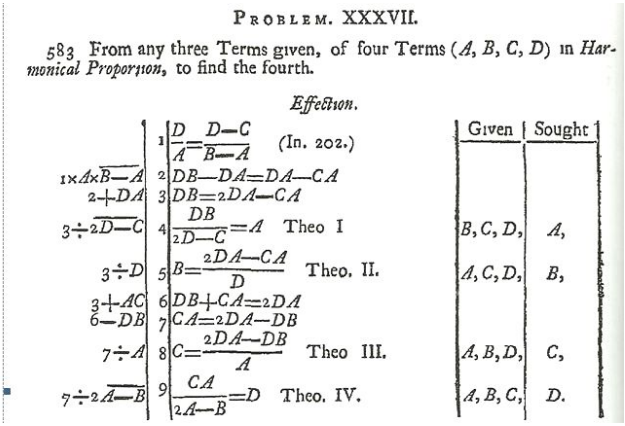
Barrow had been a Gresham College lecturer as well as occupying the first Lucasian chair at Cambridge, where his immediate successor was Isaac Newton, and a later was to be Stephen Hawking. The self-consciously eloquent oration prefaced to Barrow's lectures celebrates the endowment by Lucas of the first chair in mathematics at Cambridge University, and makes it plain that it was a novel idea to make such lectures so easily available and accessible – to those who understood Latin. Newton's *Principia* was of course also first published in Latin, during his Lucasian professorship.

As well as translating Barrow, Kirkby went further by publishing his own basic introduction to mathematics, composed in English, and his intention to make the subject accessible is clear in the title, already quoted:

> *Arithmetical Institutions. Containing a compleat system of arithmetic natural, logarithmical, and algebraical in all their branches: Whereby The Learner is led after an Easy and Familiar Manner from the very first Principles of this kind of Literature to the State unto which it is brought at present.*

It is now possible, of course, to buy numerous 'teach yourself' books on mathematics, or to follow an entire course of maths through links in Wikipedia articles, or by viewing University-sponsored YouTube video lectures. Kirkby, however, had a number of disadvantages which almost ensured that his *Arithmetical Institutions* would not enjoy its intended popular

success, still less bring in an income from royalties. In particular, trying to print complex – or even relatively simple – mathematical calculations using the notational conventions of the period, combined with eighteenth-century printing layout limitations, resulted in page after page of almost unreadable calculation. For example:



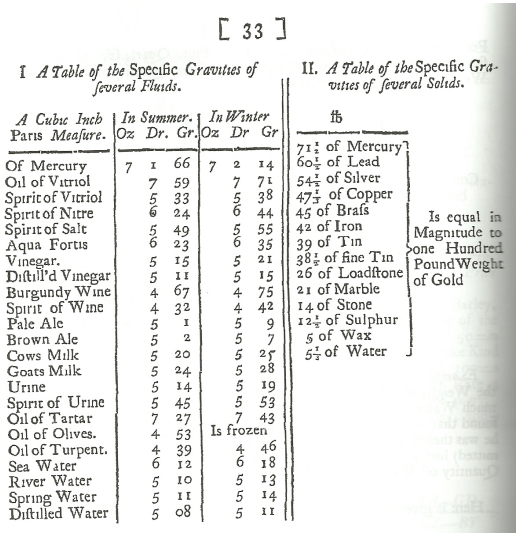
PROBLEM. XXXVII.

583 From any three Terms given, of four Terms (A, B, C, D) in *Harmonical Proportion*, to find the fourth.

Effection.

			Given	Sought
	1	$\frac{D}{A}=\frac{D-C}{B-A}$ (In. 202.)		
$1\times A\times B-A$	2	$DB-DA=DA-CA$		
$2+DA$	3	$DB=2DA-CA$		
$3\div 2D-C$	4	$\frac{DB}{2D-C}=A$ Theo I	$B, C, D,$	$A,$
$3\div D$	5	$B=\frac{2DA-CA}{D}$ Theo. II.	$A, C, D,$	$B,$
$3+AC$	6	$DB+CA=2DA$		
$6-DB$	7	$CA=2DA-DB$		
$7\div A$	8	$C=\frac{2DA-DB}{A}$ Theo III.	$A, B, D,$	$C,$
$7\div 2A-B$	9	$\frac{CA}{2A-B}=D$ Theo. IV.	$A, B, C,$	$D.$

Such problems of presentation might have been more adequately overcome, but in so far as Kirkby intended his instructions to be serviceable for practical problem-solving he could not avoid an even more intractable issue: the bewildering diversity of units of measurement current in eighteenth-century Europe. His attempt to bring order to such matters as how to calculate weights or currencies highlights the overwhelming need for some form of simplification and international standardisation. Again, here is a sample:



[33]

I *A Table of the* Specific *Gravities of several Fluids.*

A Cubic Inch Paris Measure.	*In Summer.* Oz	Dr.	Gr.	*In Winter* Oz	Dr	Gr
Of Mercury	7	1	66	7	2	14
Oil of Vitriol		7	59		7	71
Spirit of Vitriol		5	33		5	38
Spirit of Nitre		6	24		6	44
Spirit of Salt		5	49		5	55
Aqua Fortis		6	23		6	35
Vinegar.		5	15		5	21
Diſtill'd Vinegar		5	11		5	15
Burgundy Wine		4	67		4	75
Spirit of Wine		4	32		4	42
Pale Ale		5	1		5	9
Brown Ale		5	2		5	7
Cows Milk		5	20		5	25
Goats Milk		5	24		5	28
Urine		5	14		5	19
Spirit of Urine		5	45		5	53
Oil of Tartar		7	27		7	43
Oil of Olives.		4	53	Is frozen		
Oil of Turpent.		4	39		4	46
Sea Water		6	12		6	18
River Water		5	10		5	13
Spring Water		5	11		5	14
Diſtilled Water		5	08		5	11

II. *A Table of the* Specific *Gravities of several Solids.*

lb	
71½ of Mercury	Is equal in Magnitude to one Hundred Pound Weight of Gold
60½ of Lead	
54½ of Silver	
47½ of Copper	
45 of Braſs	
42 of Iron	
39 of Tin	
38½ of fine Tin	
26 of Loadſtone	
21 of Marble	
14 of Stone	
12½ of Sulphur	
5 of Wax	
5½ of Water	

Or:

DEFINITION XVIII.

300 The leaſt Denomination of *Superficial Meaſure* is a *Square Inch In* ; i e an Inch in Length and Breadth

The Table *of* Superficial Meaſure

In					
144 =	1 *Foot Square.*				
1296 =	9 *F* =	1 *Yard Square*			
3600 =	25 =	$2\frac{7}{9}$ =	1 *Pace Square*		
39204 =	$272\frac{1}{4}$ =	$30\frac{1}{4}$ =	$10\frac{89}{100}$ =	1 *Perch*, or *Pole Square*	
1568160 =	10890 =	1210 =	$435\frac{6}{100}$ =	40 =	1 *Rood.*
6272640 =	43560 =	4840 =	$1742\frac{4}{10}$ =	160 =	4 = 1 *Statute Acre.*

DEFINITION XIX

301 Becauſe an *Acre* or 160 Square *Perches* = 43560 Square *Feet* is equal to 40 *Perches* or $40 \times 16\frac{1}{2} = 660$ *Feet* in Length, and 4 *Perches* or $4 \times 16\frac{1}{2} = 66$ *Feet* in Breadth Therefore in *Land Meaſure* there is commonly uſed a *Chain* of 66 *Feet* or 22 *Yards* Long , every 10 of which in Length and 1 in Breadth (*i e* every 10 Square *Chains*) makes an *Acre* And this *Chain* is ſubdivided into 100 *Links* of 7 92 *Inches* each, according to which

Sq Chains,	*Sq Links*,	*Acre*,	*Roods*,	*Perches Square*
10 000 =	10000 =	1 =	4 =	160
2 500 =	2500 =	$\frac{1}{4}$ =	1 =	40
0 0625 =	62 5 =	$\frac{1}{100}$ =	$\frac{1}{40}$ =	1

DEFINITION XX

302 *Meaſures of Capacity* are ſuch as are of three Dimenſions , viz *Length*, *Breadth*, and *Thickneſs*, *Height* or *Depth* Of which there are eſpecially four Sorts uſed in *Britain*, viz *Corn*, *Beer*, *Ale*, and *Wine Meaſure* The leaſt Denomination to all which is called a *Cubic Inch*, 1 e an *Inch* in *Length*, *Breadth*, and *Thickneſs*

DEFINITION XXI

303. In the Table of *Corn Meaſure*, 1 *Gallon* = 268.8 *Cubic Inches*, and the leaſt Denomination is a *Pint*, *Pt*

Faced with this layout and organisation of the book, sympathetic as I am to his efforts, I would not encourage anybody to try to learn mathematics from Kirkby's well-intentioned volumes. Or study optics in Pecham's manuscripts.

There is however a further underlying problem: how far is it even possible for someone to learn mathematical procedures and skills from following a textbook, albeit well designed? Kirkby's efforts sometimes seem almost in the same category as the legendary publication *Teach Yourself Reading.*

The issue was directly raised by Kirkby's next experiment in popularising mathematics. John Pecham perhaps contributed unwittingly to Umberto Eco's fictional 'William of Baskerville' but he might have been intrigued, or baffled, to know that a later Canterbury-based cleric created a character in a novel which postulated that not only the whole of Euclid but the basics of all philosophical theology might be generated by one's determined solo efforts, even on a desert island. The 1736 *Autonous* is a novel with a self-taught mathematician as its central protagonist, as is the later version, *Automathes.*

Gibbon's useful summary account of *Automathes* continues rather less positively from the previous passage quoted:

> . . the life of Automathes aspires to the honours of a philosophical fiction. It is the story of a youth, the son of a shipwrecked exile, who lives alone on a desert island from infancy to the age of manhood. A hind is his nurse; he inherits a cottage, with many useful and curious instruments; some ideas remain of the education of his two first years; some arts are borrowed from the beavers of a neighbouring lake; some truths are revealed in supernatural visions. With these helps, and his own industry, Automathes becomes a self-taught though speechless philosopher, who had investigated with success his own mind, the natural world, the abstract sciences, and the great principles of morality and religion. The author is not entitled to the merit of invention, since he has blended the English story of Robinson Crusoe with the Arabian romance of Hai Ebn Yokhdan, which he might have read in the Latin version of Pocock. In the Automathes I cannot praise either the depth of thought or elegance of style; but the book is not devoid of entertainment or instruction; and among several interesting passages, I would select the discovery of fire, which produces by accidental mischief the discovery of conscience.

Gibbon concludes his remarks on Kirkby with the overall judgement:

> A man who had thought so much on the subjects of language and education was surely no ordinary preceptor: my childish years, and his hasty departure, prevented me from enjoying the full benefit of his lessons; but they enlarged my knowledge of arithmetic, and left me a clear impression of the English and Latin rudiments.

Automathes

The plot structures of both versions of Kirkby's novel are more complex than Gibbon's account suggests. In both there is a framing narrative in which a unnamed editor presents a manuscript which includes a further framing device enclosing the actual tale of the castaway. I will distinguish the two versions as respectively *Nous* for the 1736 publication and *Mathes* for the later and substantially expanded version of 1745, and it is convenient to refer to the protagonist simply as 'Auto' in whichever version. Extensive duplication of the text means that most quotations are in effect from both versions, though some differences are worth considering later.

One of the striking passages in both versions is where Auto teaches himself much of Euclid. In his teens he belatedly discovers a box which had survived from the shipwreck which had left him alone at the age of two upon the island:

> The only remaining things worth notice among my furniture, were the books, mathematical instruments, paper, and pencils; the uses of which I became also in some degree acquainted with, tho' this perhaps may be judged quite above my capacity. The books were three in number, (all which I still carefully preserve) *viz*. a treatise of divinity, a piece of history, and a large system of the mathematics. When I first opened these, it cannot be imagined, that I should have any more knowledge for what use they were intended, than of what matter they were composed. I turned over the leaves; but it was all one which end of the book was towards me, which from me; or whether I turned to the right hand, or to the left; and I could hardly satisfy myself, whether the characters imprinted on the leaves were the effects of Nature or Art:

Auto simply cannot read. Crucially, however, the mathematical book has 'cuts' (diagrams, illustrations):

> And had it not been for the cuts interspersed here and there, especially in the history, and the geometrical schemes, which abounded in the mathematical book, I believe I should have for ever laid them aside, without farther examination. But these, being more intelligible than the letters, convinced me of their design, and were afterwards a direction for me [how] to hold the book. And the mathematical volume became of great use to instruct me in the principles of that science, though without the least knowledge of a letter contained in it.

The notion seems to be that the diagrams are somehow more self-explanatory than the characters of the text. It is also implied that there were actual 'resemblances' or drawings of the mathematical instruments he has found in the chest.

> This taught me the use of the ruler, compasses, and brass semi-circle, from their exact resemblances upon the paper, with several ocular applications of them: By which means I presently learned several manual operations; such as to measure a right line by equal parts, to describe a circle, to bisect a right line, erect and let fall a perpendicular, to inscribe a regular polygon of any proposed number of sides in a circle, and to measure the angles or openings of two intersecting right lines by the equal divisions of an arch.

The printed numbers are (somehow) recognised as differentiated from the printed letters, while the very concept of 'number' is assumed to be self-evident. A zero 0 is happily distinguished from the letter O, though Auto seems untroubled by such issues as whether zero is indeed a 'number':

> I had also a frequent sight of the nine digits or figures, both in the book and upon the instruments; and, observing the same figures always to denote the same numbers, I became at length perfectly acquainted with their use; and likewise discovered how these alone, with the character called a cypher [a zero], were adapted to express all numbers imaginable, by the variation of their places: A contrivance, the exceeding ingenuity of which, did not a little please me.

If earlier we considered the improbability of our understanding Pecham's expositions without the benefit of accompanying diagrams we might here register considerable scepticism as to Auto being able to comprehend the function of the diagrams without understanding the accompanying text. Nevertheless, he presses on:

> But tho' I had this success with the figures, yet it was impossible for me to have the like with the letters of the alphabet, which were put to signify things I had not the least notion of. Yet I proceeded so far as to attribute to them the same design of communicating the thoughts with the other; which was the utmost I could ever make of them. And I presently found out a way, by help of the black-lead pencils, to impress several marks of my skill in geometry upon the unwritten paper, in which I made continual improvements.

There then follow several pages detailing a practical application of the mathematics which Auto has now allegedly imbibed. He creates a large and elaborate form of sundial and uses it to divide the day and the year into various segments, supplementing and supporting his investigations by also constructing a water clock by which he measures the various temporal intervals. He eventually begins to make astronomical observations, noting the results upon the sandy ground surrounding the sundial – and thereby incidentally solves the problem of how to construct geometrical diagrams without a sufficient supply of paper, or a blackboard, and presumably also how to use letters or other means to differentiate geometrical lines and vertices. The account continues:

> These constant exercises in the description of lines, circles, and angles, brought me likewise to an acquaintance with several truths in speculative geometry; for which purpose, after my paper was spent, I expunged the lines out of my dial by the fountain, and drew all my schemes upon that, inserting and blotting out at pleasure.
>
> I perceived the proportionality of the homologous sides of similar figures, and the equality between all the alternate (as well as between all the opposite) angles made by the intersection of the same right line with any number of parallels. I learned the equality of the angles in a triangle to a semi-circle, and, of any outward angle in the same to the

two inward opposite ones. I found out the subduple proportion which any angle, at the circumference of a circle, bears to one at the centre, standing upon the same basis. I discovered the equality of the areas of all parallelograms upon the same basis between the same parallels; which put me also upon studying the proportions between other dissimilar surfaces; and I likewise attained to the knowledge of Pythagoras's theorem of the equality between the square of the longest side in a right-angled triangle, and the sum of the squares of the two shortest.

And as lines led me to consider the surfaces of which they were the limits, so did these surfaces bring me to an acquaintance with the solids bounded by them; for the right understanding of which, I found great helps from the actual formation of several regular bodies out of clay: tho' the draughts themselves, which I found of these in the book, were adapted in the best manner to assist the imagination; as being delineated according to the exactest rules of perspective, and everywhere skilfully shaded.

I observed the duplicate proportion, which similar surfaces and the triplicate proportions, which similar solids, had of their altitudes, or homologous sides: And as I naturally pitched upon the square for the mensuration of the former, so did I apply the cube for the standard of these latter. I learned the chief properties of the sphere, the cone, and the cylinder; and became intimately conversant with the five regular bodies, I formed an ellipsis from the oblique cission of a cylinder, and had some notion of the other Apollonial curves, from the actual sections of a cone.

One wonders whether Auto's commendable efforts were ever confused by an interesting feature of the cuts or figures he was decoding: that they were, he says, 'adapted in the best manner to assist the imagination; as being delineated according to the exactest rules of perspective, and everywhere skilfully shaded.' Perhaps his copy was a deluxe edition.

Undeterred or undistracted by this element in the diagrams, Auto takes impressive strides into the terrain of abstraction:

I made also some progress in the more abstract theory of numbers, as well as in the more sensible speculation of magnitude. I was necessarily led to that prime distinction of number, into integer and fracted, according as the quantities they were brought to express were discontinued, or continued; and I considered them likewise in respect of their composition as even and odd, prime and composite; and compared them also together, as commensurate and incommensurate. I deduced the principal truths, which belong to the doctrine of proportions, and arrived to some skill in progressions, both arithmetical and geometrical.

The account of these wondrously self-taught skills is more or less identical in both versions and both end with the following comment:

> But yet I would have you take notice, that I attribute all those high acquirements in numbers as well as magnitudes, rather to the assistance of the book, than my own invention alone: For when I had attained to the knowledge of the numeral figures; as you have already heard, I seldom failed, through the whole work, to fish out the author's intentions by them, tho' I understood not the meaning of a word he wrote.

Though the texts may be similar, the significance of this remark is rather different in the two versions. I can, perhaps appropriately, indicate the point by a simple arithmetical calculation. In the 1736 *Nous* the long passage I have partially quoted and summarised takes up pages 77 to 90 out of a total of 117 pages in the book, and since the account of Auto's survival and self-education begins only on page 30, the discovery and his determined utilisation of the maths book takes up a considerable amount of our overall attention and seems almost the culmination of the entire narrative, apart from a final twenty pages or so devoted to theological and moral insights and a brief account of his eventual rescue.

However, in the 1745 *Mathes* while the actual number of pages devoted to the mathematical discoveries is more or less the same (pages 129 to 141) the later version has an increased overall total of 228 pages and Auto's narrative of his island experiences begins only on page 69 and finishes on page 176. Since there then follows some fifty further pages of additional material, the mathematical episode correspondingly looms far less prominently in the revised novel and is certainly no longer the climax of the book as a whole.

It is tempting to pursue a tongue-in-cheek deconstructive reading of the assumptions operating in *Autonous*, along the lines of Derrida's critique of Husserl's *The Origins of Geometry*, but I will confine myself for the moment to a literary analysis.

An Effectual and Easy Demonstration

The modified structure of the 1745 version needs to be further outlined. *Nous* had simply opened with a brief page or so claiming that the unnamed narrator 'I' had heard the story of Autonous 'during my abode in the kingdom of Epinoia', and by page 3 Autonous is entertaining his guests on a river trip in Epinoia by telling them a tale of his father and, from page 30, his own. The 1736 version had ended with a single paragraph saying that Autonous 'finished the relation of his life upon the island' and 'the Day drawing to an end, we put ashore at a gentleman's seat of his acquaintance, close by a creek of the river, where we agreeably spent the evening.' In

contrast, the more elaborated 1745 *Mathes* opens with the apparently autobiographical remarks of Kirkby 'himself' as quoted by Gibbon, which then lead to an account of the narrator finding a trunk in the sea containing a manuscript which he salvages from water damage, and discovers to be an account, dated 1614, by a Catholic Benedictine missionary, of an unintended voyage to a remote civilisation, located at 'Latitude 39 degrees, 15 minutes North, and about 176 degrees West Longitude from London'.

This multi-layered pseudo-verisimilitude is continued, with supposedly 'editorial' comments, until we are allowed to read the actual 'manuscript'. This opens with an extensive account of the history and government of a country 'called Soteria', including a lengthy interview with a Bishop who interrupts his discourse to introduce Autonous briefly and then to give a summary account of the life we will later be told more or less as in *Nous,* though we are first given a more detailed account of Autonous's father.

After Autonous himself has later concluded the narrative part of the novel he offers what is effectively a lengthy sermon, told, still within the framing device, to the Benedictine missionary, and the supposed manuscript eventually concludes with what is almost a separate short story, the whole elaborately layered composition ending abruptly with a final paragraph reverting to the fiction of a salvaged manuscript:

> Thus far, and no farther, could I make any sense of what was contained in this manuscript: Here therefore, I am forced to conclude, without being able to give any other account of it, than what you have already heard concerning the strange means, by which it fell into my hands. If the publication of so much as I could pick out, may be of any service to the cause of religion and virtue, as I am not without hopes in some measure it may, I am satisfied.

At times the revised novel reads more like *Tristram Shandy* or the multi-storied *The Saragossa Manuscript* than *Robinson Crusoe* or even *Gulliver's Travels.* In this radically re-shaped and expanded structure the episode of a dozen pages devoted to self-taught mathematics has become decidedly subsidiary, while the comment that Autonous owed his mathematical discoveries not so much to his solitary auto-didact efforts as to the indirectly transmitted social contribution of the book now fits into new extensive and repeated assertions about the crucial importance of education.

In particular, the detailed account of the structure and function of the ecclesiastical order in 'Soteria' emphasises two points: that the clergy should have no personal money at all, and that their primary job is to educate the young:

> The only fixed residence of the clergy was in a kind of cloister or college, with their Bishop, near the main entrance of the cathedral. Here they, in every diocese, had all their maintenance in common,

every one indiscriminately, as his real need required, out of the revenues of the Church: the principal part of which being reserved for the maintenance of the poor and necessitous, the education of their youth, and the wants and repairs of their several Churches, colleges, and hospitals.

On one side of each cathedral stood the hospital of the poor for the whole diocese, divided according to their different sexes; all, who were able, being kept in some sort of useful employ. And the same order was observed in the hospital for the sick and diseased, whose necessity obliged them to depend upon the public charge; which was situated on that end of the cathedral opposite to the college of the clergy; but the largest of all these buildings, next to the Cathedral itself, was the college for the education of the youth of the diocese, of both sexes, on the contrary side to the hospital for the poor.

This differed from the rest, in that it was common to rich, as well as poor, with this difference only, that the former were obliged to pay for the maintenance and education of their children; while the latter received all *gratis*, in as ample a manner, without respect of persons, and with this addition, that the public was obliged to put them to some suitable employ at a proper time. And this payment of the rich was a part of the public revenue of the Church, to which no particular person had a private right, any more than to the rest; the education of the boys, being the proper charge chiefly of the clergy under the Bishop, during their absence from their respective parishes; and the other sex were entrusted, in a separate apartment, to the care of a sufficient number of pious women, called Deaconesses, who, out of love to a religious life, had sequestered themselves from the world for that purpose; no religious person of either sex being allowed to take the least reward to themselves for their trouble in that respect, any more than for the performance of any other religious act, under pain of being suspended, if not quite degraded from their office; and when they heard of what we in *England* call surplice-dues to the clergy for marriages, burials, and Churchings, they looked upon it as no better than downright sacrilege, and the most intolerable abuse of the poor.

It is worth quite carefully re-reading this passage, especially perhaps comparing such a detailed programme with the actual function of cathedrals in mid-eighteenth-century England.

Whether Kirkby had specifically in mind the cathedral in Canterbury and perhaps its attached Kings School, the poverty-loving Franciscan friar John Pecham might well have been impressed by these patently satirical or utopian reflections upon the development of the post-Reformation English church.

On the other hand, Kirkby's clerical contemporaries might well have regarded such implicit proposals for the transformative reform of a

collegiate Cathedral as unacceptably radical, and even as anticipating a certain Christian socialism. Certainly, the revised novel was a publication unlikely to further Kirkby's chances of gaining a lucrative Kent living from the Canterbury Dean and Chapter – though the much later Red Dean Hewlett Johnson might have applauded.

Kirkby's text, explicitly attributed to a Catholic Benedictine monk, can be even more barbed:

> In short, all possible occasions were here taken away for tempting persons to enter among the number of the clergy out of any worldly view. They had, indeed, an ample sufficiency for them in their way of life; but in this, abating the somewhat more leisure they had for devotion and study, they were not one jot above the poorest person in the kingdom: And the superiority of their office in the Church gave them only this advantage above their brethren, that they were attended with a greater load of care.
>
> Every ecclesiastic, from the highest to the lowest, was obliged to live under the same rule of discipline; and the distinction of superior and inferior among them, being altogether spiritual, was not allowed to depend upon any secular advantage. The lowest was allowed to have a right to a competent supply for his natural necessities, and if the highest should plead, that he merited more, it was looked upon as the most certain sign of his want of merit, and that he was highly unworthy of the superiority he had attained.
>
> Nor could the care of their family, or children, if they had any, be here an excuse for such solicitations; for the public had made the same competent provision for them, as for the children of other poor persons; and, if they before had sufficient estates of their own, they were provided for already. So that money was a thing, which every ecclesiastic in this country was anticipated from the least personal occasion for, in any respect: And therefore, upon his best ordination to his office, he was obliged, for ever after, to renounce all use of it. And the same order and economy, was observed in every diocese through the kingdom.
>
> Only I cannot here forbear remarking an instance of the prudent frugality, as well as piety, of this people, in those public buildings; which seemed to me a just reproach to our *European* Christians. The structure and ornaments of their Churches everywhere, the cathedrals especially, appeared as much superior to every other edifice, as the esteem and regard, which a pious mind will think it becoming to have for places and things dedicated to the service of God, above any thing designed for his own private use: And yet all their other public buildings, for the clergy, as well as laity, were managed after a quite different design; for these latter were, indeed, decent, but far from sumptuous, affording nothing to the eye, which could be thought

> anyway superfluous; nothing but what was judged most convenient for the end to which they were designed; that nothing should be wanting, which was necessary to render life comfortable, nor yet any thing be found, which might administer to luxury.

William Morris might have concurred with that passage. Perhaps Kirkby's forgotten novels should be put on sale in the Canterbury Cathedral gift shop.

It is clear that in the revision of his novel Kirkby incorporated some of those elements of his pamphlet on 'ecclesiastical revenues' which had most probably lost him any disproportionately lucrative share in such revenues. One passage in the 1743 tract concerns the founding of the church upon the apostles and later the clergy:

> These, as a Society, were to be a standing pattern in every good work, not only for particular persons, but for every other society to copy after. They were to be as the leaven of the whole Christian church of life, the salt of the earth, and the light of the world, which was so to shine before men that they might see their good works, and glorify their Father, which is in heaven. This society therefore as such was required by our Saviour to have its sole dependence upon him and his promises, and have no further to do with worldly things, than what was barely necessary to supply the wants of nature, in a manner becoming such as profess themselves to be strangers and pilgrims upon earth. If ye abide in me, says he, and my words abide in you, ye shall ask what you will, and it shall be done unto you. Therefore take no thought, saying, what shall we eat? or what shall we drink, or were withall shall we be clothed? For after all these things do the Gentiles seek, for your heavenly Father knoweth that ye have need of all these things. But Seek ye first the kingdom of God and his righteousness. And all things shall be added unto you.

Perhaps Kirkby had been reading Saint Francis of Assisi. Or simply regarded the systematic application of such New Testament principles to the distribution of ecclesiastical revenues as a no less rational application of basic theological premisses than the working through of the mathematical consequences of the most elementary geometrical diagrams.

self-explanatory fictions

The revised 1745 novel seems deliberately restructured to allow Kirkby to incorporate into it a variety of his concerns, perhaps even by composing a collage of his pre-existing writings, such as Autonous' concluding 'sermon' (originally one of Kirkby's own?) and the concluding almost stand-alone

short story (perhaps another abortive attempt at an income-earning fiction?). But let us return to the mathematical component. There is an unresolved tension between the original emphasis upon the extent to which Autonous was able to instruct himself in geometry and, on the other hand, the insistence in *Mathes* on the role of socially supported instruction, not self-education.

Before Kirkby wrote *Nous* in 1736 he had already published *Arithmetical Institutions* in 1735 and in 1734 his translation of Barrow's Latin lectures on mathematics, as *The Usefulness of Mathematics*. Neither volume would have been of the slightest use to the illiterate Autonous since the only 'cut' in the enormous Barrow volume is a single sheet inserted after page 440 which crowds together the eleven figures referred to at scattered points in the extensive text, with no way even of locating the appropriate specific expositions from the composite cut itself. Kirkby's own 1735 volume has not a single diagram.

Yet by 1736 Kirkby had clearly envisaged a wonderfully self-explanatory volume of introductory mathematics, conveyed through pellucid geometrical diagrams, which could not only inform but captivate and inspire an otherwise uninstructed reader. The Autonous of his novel surely represented a fantasy readership, eager and capable, and willing to buy Kirkby's text-books. Indeed, such a volume could perhaps have been a high-earning best-seller – if only Kirkby had been able to write it. All he could actually do was to conceive it as already written, albeit abandoned on a desert island and accessible only to a reader of compensatory imagination, a fiction.

Similarly, his polemical 'Demonstration from Christian Principles' that 'the present regulation of the ecclesiastical revenues in the Church of England' was entirely unjust, not least to himself as a victim of the inequitable distribution of those revenues, might have been envisaged as a logically unassailable argument – but again could only be realised in an entirely fictional creation, the state of Soteria depicted in the 1745 version of the novel. Any approving applause his publications might have merited could likewise only be imaginary. When in *Mathes* Autonous finally concludes his additional sermon-like assemblage of wise advice and judicious observations, the text records:

> We returned him our hearty thanks for the pleasure he had given us in this wonderful narration of his life upon the island in such lively descriptions, and for the many ingenious and instructive reflections, with which he had all along so artfully mixed it. Above all, we assured him, that we could never sufficiently discharge the obligations he had laid upon us for those judicious inferences, to which he had improved it in the conclusion. These gave us the most ample demonstration of the unparalleled strength of his genius, the extensiveness of his capacity, and the clearness of his conceptions: and we expressed no

small satisfaction in this evident proof, which he had favoured us with, of the absolute necessity of divine Revelation from a consideration, which had scarce ever before entered into our thoughts.

Given that Kirkby had himself composed the 'demonstration of the unparalleled strength of [Autonous's] genius' is it unfair to recognise here a perhaps wistful, but possibly ironic and tongue-in-cheek, self-acclaim as a further fictional compensation for his persistently unfortunate and unlucky life?

Perhaps indeed, even in real life, he already had high, but cautious, expectations for what was to be his final and extraordinarily ambitious publication:

An Effectual and Easy Demonstration, From Principles purely Philosophical, of the TRUTH of the sacred eternal coequal Trinity of the Godhead; and of the Perfect Inextension of Matter in Space. To which is prefixed, As much extracted from a presumed Improvement of Logic, preparing for the Press; as is necessary to render the Whole of what is here delivered, evident to the Apprehension of the lowest intelligent Reader. By John Kirkby, Rector of Blackmanstone in Kent.

Once again, this obscure and poorly-paid Kentish clergyman John Kirkby has tried to elaborate not just a logical argument or 'demonstration' of the very Godhead but characteristically announced (but did not deliver) a whole new system of logic to validate that 'judicious inference'. Had he managed to provide such a demonstration he might well have seen it as a wholly new application of quasi-mathematical rationality. In *Mathes*, before we have even heard the narrative of Autonous' apparently unfortunate life, we are reassured that when he finally returns to civilised society his assumed disadvantages will have proved to be quite otherwise:

As for myself, my father could not, indeed, but lament the ignorant condition in which he found me, being as destitute of all language, as the brute beasts my companions; but the exceeding tractableness of my disposition gave him great hopes, that due care might happily retrieve the loss I had sustained in my education, which happened in the principal time of life for acquiring it.

But in this I much surpassed his expectation; for when I became capable of expressing my thoughts to my tutors, to their great amazement, they found me more like a polished Christian, than an ignorant Savage; having attained as just a notion of many important truths, as if I had learned them from the mouth of one of the wisest sages. I seemed to them to have convinced myself of the manner of my own original, from that of other creatures; and, from the works of the creation, to have inferred the being of the creator.

> The utter incapacity of thought in matter, as such, seemed to have instructed me in the independence of these one upon another; and from hence I appeared to have gathered the natural incorruptibility of the thinking principle. I was discovered to have learned a sort of arithmetic peculiar to myself and my necessities had also taught me to perform several problems in geometry.

Leaving aside whatever traces of Kirkby's relations to his father the passage may contain, a classic over-compensatory ambition is clearly legible. Despite his bad luck and poor prospects, Kirkby will finally amaze the world.

In 1748 he did publish his own 'sort of arithmetic peculiar to myself', in a text entitled:

> *The Doctrine of Ultimators. Containing a New Acquisition to mathematical literature, Naturally resulting from the Consideration of an Equation, as reducible from its variable to its ultimate State: Or, a Discovery of the true and genuine Foundation of what has hitherto mistakenly prevailed under the improper Names of Fluxions and the Differential Calculus. By Means of which We now have that Apex of all Mathematical Science entirely rescued from the blind and ungeometrical Method of Deduction, which it has hitherto laboured under; and made to depend upon Principles as strictly demonstrable, as the most self-evident Proposition in the first Elements of Geometry. By the Reverend Mr. John Kirkby, Vicar of Waldershare in Kent.*

We can acknowledge that, according to standard accounts of the development of the calculus, the 'correct' understanding of the nature of the calculus was not properly established until long after its disputing initiators, and indeed may not have been completely cogently justified even now. Nevertheless it has to be admitted that John Kirkby does not figure as a decisive contributor to that history. Indeed, I doubt if his book has been read by more than a sparse scatter of curious mathematicians.

However, in his wish-fulfilling fiction, both Autonous and his father emphatically, if a little unconvincingly, declare that their misfortunes have, like those of Job, finally brought them to a more blessed state than they would otherwise have appreciated. Perhaps John Kirkby wanted to believe that his own singular lack of earthly success, despite his determined and repeated attempts, might even indicate some special divine favour. At least he hadn't actually ended up on a desert island.

without language

It is time to focus on a number of specific issues. Autonous' father was surely right to be concerned about his son's lack of language acquisition. We might recall Gibbon's praise for Kirkby's own attempt to make the

acquisition of grammar accessible, but it therefore seems even more extraordinary that Kirkby represents Autonous as being able to articulate to himself *without language* even the most demanding of intellectual observations. In so far as the narrative is supposed to transcribe what Autonous was actually thinking to himself, almost any of the quotations so far given from his life upon the island are quite simply unbelievable if at no point he had actually acquired human language.

Yet it is profoundly part of the overall epistemological and philosophical position which Autonous allegedly arrived at by himself that the immaterial 'self' which he adduces from supposed first principles is so divorced from material corporeality that it seems (especially allowing its supposed capacity for surviving death) to have no need of a working brain, or even of a tongue in its mouth, let alone that interiorisation of exchange and conversation with others which forms the process of becoming able to speak to oneself and which constitutes what one normally calls thinking. Perhaps ironically in this context, Kirkby's own *Grammar* had taken the form of a dialogue. It is also a persistent strand in that same philosophical tradition that mathematics has no intrinsic need of ordinary language but constitutes a kind of abstract system of intelligibility in its own right. Which raises questions about how we conceive of the nature of mathematics itself.

There is a formidable tradition of conceptions of 'thought' as dissociated from the practice of language. One of the possible influences upon Kirkby's novel was the Latin translation in 1671 by Edward Pococke of Ibn Tufail's *History of Hayy Ibn Yaqẓan,* published as *Philosophus autodidactus*, which was then translated into English by Simon Ockley in 1708. In one episode the protagonist, also left to fend for himself from infancy on a desert island, dissects the body of an animal in order to satisfy his self-induced curiosity as to the 'primary' bodily organ. He manages to speak to himself with an impressively technical vocabulary and even eloquent style without, it seems, ever having acquired language:

> He proceeded in his search, till at last he found the Heart, which when he saw closed with a very strong Cover, and fasten'd with stout Ligaments, and cover'd by the Lungs on that side which he had open'd, he began to say to himself: "If this Organ be so on the other side as it is on this which I have open'd, then 'tis certainly in the midst, and without doubt the same I look for; especially considering the Conveniency of the Situation, the Comliness and Regularity of its Figure, the Firmness of the Flesh, and besides, its being guarded with such a Membrane as I have not observ'd in any other part."

Perhaps an illustrated copy of William Harvey's work had somehow been left on the island.

Autonous on his own desert island may have somehow grasped the significance of number symbols, but he admits that alphabetical letters

remained wholly inaccessible to him. One question which has persistently shadowed the development of mathematicized science has been whether we can fully dispense with ordinary human language and yet still understand what purports at times to be a language in its own right: that of mathematics. And every writer of a popular science book has confronted the problem: can one provide a credible and accurate exposition of modern scientific theories for those who lack the appropriate mathematical expertise? More widely, can one be, in Gibbon's apt phrase for Antinous, a 'speechless philosopher' – or a speechless mathematician for whom diagrams ('cuts') and equations suffice?

calculus

In choosing to translate Isaac Barrow's mathematical lectures in 1734, long after Isaac Newton's work had displaced Barrow's, did Kirkby simply miss the boat on his first attempt to further his career? Isaac Barrow (1630-1677) had once been a major figure. As Professor of Greek at Cambridge University in 1662 he had supplemented his slender income by concurrently accepting the Gresham Professorship of Geometry and also acting as locum for the astronomy professor. In 1663 he resigned the Greek chair to become the first Lucasian Professor of Mathematics at Cambridge. He occupied that position for six years before recommending that Isaac Newton become his successor. Despite his reputed classical knowledge Barrow never published any philo-logical or textual studies, and although he was one of the first Fellows of the Royal Society after its incorporation in 1662, he never took an active part in its meetings. After resigning the Lucasian professorship Barrow became Master of Trinity College and concentrated on his other interests. His hefty theological works, mainly sermons, were posthumously edited in 1683–1689, by John Tillotson, later to become Archbishop of Canterbury.

Barrow's three sets of Cambridge mathematics lectures (though he may not have delivered all of them) spanned optics, geometry, and general mathematics. Newton inherited this agenda, offering his own first lecture series on optics and claiming to continue from where Barrow had left off, though actually developing his own directions. Barrow had a copy of Pecham's *Perspectiva communis* in his personal library though in his lectures he mainly surveyed developments in geometrical optics only since Kepler, which Newton's *Opticks*, eventually published in 1704, was to supercede.

It has sometimes been claimed that Barrow partly anticipated the calculus, in advance of both Newton and Leibniz, but this has been largely discounted. Whiteside, the formidable editor of Newton's mathematical papers, dismissed the claim as 'outrageous'.

Possibly Kirkby calculated that since Barrow still retained in the 1730s a major reputation as a theologian there might be a market for an English version of his mathematical works, as there had already been for English

translations of Newton's works. In addition, precisely because Barrow had been a transitional figure, between the classical and mediaeval mathematical traditions and the emergence with Descartes, Newton, and Leibniz, of a new mathematics, Kirkby might have regarded Barrow as the last prestigious English figure whose work could provide an exposition of a still accessible mathematics. Perhaps Barrow's approach to mathematics was the furthest limit Kirkby himself could endorse, or even comprehend, or he considered that it comprised that limit for the readers he anticipated, whereas the new algebra, analytical geometry, and the calculus, had marked a kind of watershed in the accessibility of mathematics for a general public.

When a reprint of Kirkby's translation of Barrow's mathematical lectures was published in 1970 Whiteside's review emphasised (with predictable aspersions upon poor Kirkby) precisely this old-fashioned character of Barrow's work:

> The present vernacular translation, by the obscure Cumberland clergyman [*sic*] John Kirkby, was published . . when the hard work of such London 'philomaths' and itinerant teachers as De Moivre and Edmund Stone (himself to produce an English rendering of Barrow's companion 'Geometrical Lectures' the next year in 1735) had created a reading public for the standard Latin mathematical texts of the previous century, not least for those on which Newton's shadow seemed to fall.
>
> In terms of content there is little that is original in Barrow's eclectic compilation from the work of such ancient mathematical philosophers as Aristotle and Proclus, and of such neo-scholastic counterparts as Ramus, Hobbes, and Borelli. His themes – the nature of mathematical truth and demonstration, the complementarity of discrete (numerical) and continuous (spatial) magnitudes, and their (Euclidean) proportion and commensurability – are all well trodden, though handled by him with a distinctive freshness and sparkling wit whose nuances are, unfortunately, lost in the present pedestrian translation. In his essentially classical scheme, where mathematical quantities are split into the dichotomy of the arithmetically countable and the geometrically measurable, algebra (the 'Analytic Art') finds no comfortable niche in either and it is deemed (Lecture II, p. 28) to be 'not a Part or Species of, but rather an Instrument subservient to the Mathematics'. . . We are here a world away even from Newton's contemporary understanding of algebra as a 'universal' arithmetic (and geometry) comprehending all general mathematical techniques and methods of proof. Nor should we ignore the historical truth that Barrow's ideas, whatever their quality and their novelty, were relatively without impact. There will be few who will gain much from an untutored reading of Barrow's book three hundred years on.
>
> (*The British Journal for the History of Science*, Vol. 6, No. 1, June, 1972)

Elsewhere, Whiteside has summarised Barrow's lectures as concerned with:

> Such topics as the ontological status of mathematical entities, the nature of axiomatic deduction, the continuous and the discrete, spatial magnitude and numerical quantity, infinity and the infinitesimal, and proportionality and incommensurability . . Barrow's conservatism reveals itself in his artificial preservation of the dichotomy between arithmetic and geometry by classifying algebra as merely a useful logical (analytical) tool which is not a field of mathematical study in itself.

Whiteside's dismissive summary indicates almost exactly the range of topics which Kirkby's Autonous is represented as discovering for himself while on his island.

Though Kirkby's novel presents some similarity with Descartes's account of his own alleged self-education from first principles, Descartes's *Geometrie* with its preference for equations and its somewhat sparing use of diagrams would have been of little assistance to Autonous, since Descartes's argument was in effect that 'geometrical demonstration' should not only be supplemented but effectively replaced by algebraic analysis, even if geometrical proofs might offer a superseded form of supplementary support. Consider the opening of Descartes' treatise (which accompanied his work on optics and was prefaced by the *Discourse on Method*), which effectively signalled the displacement of classical geometrical by algebraic procedures, or 'analytical geometry':

> All the problems of geometry can easily be reduced to such terms that thereafter we need to know only the length of certain straight lines in order to construct them. And just as all of arithmetic is composed of but four or five operations – namely, addition, subtraction, multiplication, division, and the extraction of roots, which may be considered a species of division – so in geometry, in order to find the lines for which we are looking, we need only add to them, or subtract from them, other lines; or else, by taking one line which I shall call unity, in order to relate it as closely as possible to numbers, and which usually can be chosen arbitrarily, and then by taking two others, [we may] find a fourth line which is to one of these two lines as the other is to the unity – which is the same as multiplication; or else [we may] find a fourth line which is to one of the two as the unity is to the other which is the same as division; or finally, [we may] find one, or two, or several mean proportionals between the unity and some other line – which is the same as extracting the square root, or cube root, etc. And I shall not hesitate to introduce these arithmetical terms into geometry, in order to make myself more intelligible.

These 'lines' are not to be regarded as those familiar from drawing traditional geometrical diagrams, but rather as ways of calculating with essentially abstract numbers or pure ratios, and 'arbitrary' units. The comment 'taking one line which I shall call unity [and] which usually can be chosen arbitrarily' is glossed:

> But often one has no need so to trace these lines on paper, and it suffices to designate them by certain letters, one for each. Thus, in order to add the line BD to GR, I name the one *a* and the other *b*, and write $a + b$; and $a - b$, in order to subtract *b* from *a* ; and *ab*, in order to multiply the one by the other; and a/b, in order to divide *a* by *b* ; and *aa* or a^2, in order to multiply *a* by itself; and a^3, in order to multiply this again by *a*, and so on to infinity.
> . . Here it is to be noted that by a^2 or b^3 or the like, I ordinarily mean only simple lines, although, in order to make use of the names used in algebra, I call them squares, cubes, et cetera.

Descartes acknowledged that he is here departing from the traditional relationship between arithmetic and geometry and that his readers might find his innovations difficult:

> Up to this point I have tried to make myself intelligible to everyone. However, for this treatise, I fear that only those who already know what is in geometry books will be able to read it.

The full implications of Descartes's use of algebraic symbolisation and calculation were only gradually to become apparent. For example, it was no longer clearly the case whether *a* 'squared' (a^2) indicated, however indirectly, an actual square, that 10 inches multiplied by 10 inches resulted in 100 'square inches' or rather that 10 inches multiplied by 10 inches might equal 100 inches, simply another length. Conversely, the notion that a certain magnitude of time might legitimately be 'squared' (t^2) became more apparently thinkable as the relationship between measurable units and algebraic symbols became more flexible and familiar. If it was still problematic to envisage a 'time' that was 'multiplied' by another 'time', or imagine a time at right angles to another time in a diagram, the issue was at least less visible than in a geometrical diagram. Though how the speed of light can be multiplied by the speed of light, in whatever arbitrary units, can re-emerge when contemplating Einstein's $E=mc^2$

As for the calculus, it is clear from Kirkby's own treatise on what he called 'Ultimators' that he regarded both Newton and Leibniz as radically mistaken in their underlying premises. Kirkby sardonically complained (his prose is mildly modernised but still needs disentangling):

An Ultimator is the very same with what has been styled a Differential by some, and Fluxion by others. Both which last terms will be discovered to be much about as expressive of the true meaning of the thing as the sound of a trumpet would be to convey the idea of colour to a man born blind. The name Differential taken in this sense is proved to imply a flat contradiction; and that of Fluxion the same way applied can possibly have no meaning at all. For pray what kind of meaning can be made of such unintelligible jargon as this:

> <We are taught that tho' Fluxions cannot be called Quantities themselves, yet they have the Ratio of Quantities. And because it is impossible for anyone to understand how Things can have the Ratio to one another of Quantities without considering those Things at the same Time as Quantities themselves some way the Subjects of Extension and Divisibility, therefore to make us understand this Ratio it is said to be that of the first nascent Increments or last evanescent Decrements of a Quantity. That is, according to the Explanation at the same Time given of these Terms; It is the Ratio of an Increase without any Increase, or of a Decrease without a Decrease, and all this perform'd in Time and no Time by a Motion and no Motion. >

But the superlative impropriety of the word Fluxion when applied to this purpose will fully appear when we come to consider that it is put to express an Idea which arises from the contemplation of Quantities purely as Quantities: that is, in the same abstract manner, as they are the proper subject of Algebra, exclusive of every other consideration; and consequently have not the least regard to Time or Motion, which are necessarily implied in a Fluxion. And the essential Property of a Fluxion is certainly excluded, after the most singular manner, in the Idea of a Quantity considered at its *Ne plus ultra*: that is, in other terms, when it is in a state where all possibility of such imaginary Flux is taken from it. So that the term Fluxion when used to this purpose, if it have any meaning at all, is as contrary to the true as darkness is to light. Such are the absurdities which must necessarily follow from absurd principles.

Kirkby adds, even more indignantly and scornfully:

> Such I affirm these notions of a Fluxion and a Differential to be. Things which can possibly have no existence in nature: but seem purely to have been brought into the imagination by a mixed multiplication of finite quantities and indivisibles together, according to their supposed generation of magnitudes; which accidentally threw the ingenious inventor upon those consequences, that naturally flow from the reduction of an equation to its Ultimum: while, it is plain, he in the

meantime had not the least suspicion of the real foundation upon which his own superstructure must rest.

From whence it will abundantly appear what good reasons the sagacious author of *The Analyst* had to condemn the foregoing methods for the same ends; how malapertly soever that work has been rather cavilled at, than judiciously answered by any.

Kirkby is here evoking an (in)famous passage in Bishop Berkeley's *The Analyst: A Discourse Addressed to an Infidel Mathematician* (1734):

> And yet in the *calculus differentialis*, which Method serves to all the same Intents and Ends with that of Fluxions, our modern Analysts are not content to consider only the Differences of finite Quantities: they also consider the Differences of those Differences, and the Differences of the Differences of the first Differences. And so on *ad infinitum*. That is, they consider Quantities infinitely less than the least discernible Quantity; and others infinitely less than those infinitely small ones; and still others infinitely less than the preceding Infinitesimals, and so on without end or limit. Insomuch that we are to admit an infinite succession of Infinitesimals, each infinitely less than the foregoing, and infinitely greater than the following. As there are first, second, third, fourth, fifth *&c.* Fluxions, so there are Differences, first, second, third, fourth, *&c.* in an infinite Progression towards nothing, which you still approach and never arrive at. And (which is most strange) although you should take a Million of Millions of these Infinitesimals, each whereof is supposed infinitely greater than some other real Magnitude, and add them to the least given Quantity, it shall be never the bigger. For this is one of the modest *postulata* of our modern Mathematicians, and is a Corner-stone or Ground-work of their Speculations.

Berkeley memorably summed up his attack:

> And what are these Fluxions? The Velocities of evanescent Increments? And what are these same evanescent Increments? They are neither finite Quantities nor Quantities infinitely small, nor yet nothing. May we not call them the Ghosts of departed Quantities?

Among other 'ghosts' already lurking here are those to be conjured up by Dedekind, Cantor, Hilbert, and so on.

By contrast, here is Barrow, with his emphasis on 'common sense', yet at the same time postulating an effectively arbitrary extrapolation of possible mathematical calculation (my emphasis):

> Accordingly philosophers argue with great subtlety on the nature of motion, its true definition; the causes thereof, and the several

differences, all which are of very little concern to mathematicians. It is enough that *these take for granted what is allowed by common sense*, and proved by obvious experience; and first this general principle, viz. that any magnitude (among which I esteem even a point, as the least of all magnitudes, and likewise an infinite or greatest magnitude, between which two, all intermediate finite magnitudes are placed) is moveable; that is, in what manner whatsoever we behold it, the same may be made to change its place continually, according to prescribed differences, viz. with a straight or circular motion; equally swift, or in any manner more accelerated, or retarded: I say, *mathematicians assume at pleasure any motions of this kind as evidently possible, in order to find out and demonstrate what follows from thence*.

Kirkby's own attempt in his theory of 'Ultimators' to provide an alternative to Newton and Leibniz has left almost no trace in the history of mathematics, and it is not clear from his peculiarly opaque text whether he had any coherent alternative conception to offer.

However, the conceptual basis for the calculus remained deeply uncertain throughout the eighteenth century and though Carl Boyer's 1959 classic *History of the Calculus and its Conceptual Development*, for example, might claim that its intellectual credibility was finally assured, it nevertheless remains the case that 'common sense' reactions to the core notions of the calculus can still chime more with Bishop Berkeley's. Here is Boyer's own overview (my emphasis):

> The attitude of most of the mathematicians of the seventeenth century, however, was that of doubt. They employed infinitesimals and the infinite on the assumption that they existed, and treated the continuous as though made up of indivisibles, the results being justified pragmatically by their consistency with Euclidean geometry. In any case, the attitude was not that of an unprejudiced postulation and definition, followed by logical deduction. The investigations into the foundations of the calculus consequently took the form, during the eighteenth century, of *a search for an explanation which should be intuitively plausible, rather than logically self-consistent.*
>
> At this time, however, there was rapidly developing a very successful algebraic formalism, vigorously fostered by Euler and Lagrange. This led, in the nineteenth century, to a view of mathematics which non-Euclidean geometry had strongly suggested – a postulational system independent alike of the world of sense experience and of any dictates resulting from introspection.
>
> The calculus became free to adopt its own premises and to frame its own definitions, subject only to the requirement of an inner consistency. The existence of a concept depended only upon a freedom from contradiction in the relations into which it entered. The bases of

> the calculus were then defined formally in terms only of number and infinite aggregates, with no corroboration through an appeal to the world of experience either possible or necessary.

For Boyer, the construction of a 'pure mathematics' followed:

> Mathematics is neither a description of nature nor an explanation of its operation; it is not concerned with physical motion or with the metaphysical generation of quantities. It is merely the symbolic logic of possible relations, and as such is concerned with neither approximate nor absolute truth, but only with hypothetical truth. That is, mathematics determines what conclusions will follow logically from given premises.
>
> The conjunction of mathematics and philosophy, or of mathematics and science, is frequently of great service in suggesting new problems and points of view. Nevertheless, in the final rigorous formulation and elaboration of such concepts as have been introduced, mathematics must necessarily be unprejudiced by any irrelevant elements in the experiences from which they have arisen. Any attempt to restrict the freedom of choice of its postulates and definitions is predicated on the assumption that a given preconceived notion of the nature of the relationships involved is necessarily valid.

Yet between these two passages Boyer himself surveys the considerable resistance to this wholly formalistic account of the foundations of the calculus, and of mathematics more generally. Indeed, one is reminded at times of the allegations that 'scholastics' simply made up whatever premises they preferred in order to construct impeccably logical syllogisms to prove, say, how many angels could cavort on a point, indivisible or otherwise.

Bishop Berkeley, author also of *A New Theory of Vision*, had launched his attack upon the calculus largely in order to combat – and Meric Casaubon might have concurred – the threat to religious belief posed by the insidious claim of the masters of the new mathematics, that they were thereby equipped to challenge the intellectual basis of theology. Berkeley sarcastically concluded that the intellectual credentials of the calculus itself were as open to critique as those of theological arguments:

> All these Points, I say, are supposed and believed by certain rigorous Exactors of Evidence in Religion, Men who pretend to believe no further than they can see. That Men, who have been conversant only about clear Points, should with difficulty admit obscure ones might not seem altogether unaccountable. But he who can digest a second or third Fluxion, a second or third Difference, need not, methinks, be squeamish about any Point in Divinity. There is a natural Presumption that Mens Faculties are made alike. It is on this Supposition that they

> attempt to argue and convince one another. What, therefore, shall appear evidently impossible and repugnant to one, may be presumed the same to another. But with what appearance of Reason shall any Man presume to say, that Mysteries may not be Objects of Faith, at the same time that he himself admits such obscure Mysteries to be the Object of Science?

Kirkby cited Bishop Berkeley in the preface to his *Ultimators*, but he may have also recognised in the 'common sense' approach of Isaac Barrow a different and unexpected justification for religious belief. It was an implication of Barrow's position that, provided a mathematical system was not intrinsically or logically self-contradictory, it was open to God to have implemented that system in the physical realisation of an alternative world or universe. Indeed, Barrow argued that since God's omnipotence was limited only by his own will and by the restraint of logical self-contradiction, therefore no amount of investigation, experimentation, or calculation could guarantee the necessary applicability of secondary causes. In other words, that any scientific conclusion was susceptible to being counter-manded by divine intervention.

It was a consequence of Barrow's logic of mathematics that the occurrence of 'miracles' did not indicate a gap in, or violation of, God's oversight and sustenance of natural physical laws, but rather indicated the fundamental character of God's relationship to the natural world: that the very systematicity of the natural or physical world, revealed by experimentation, was always susceptible to divine amendment, and in particular that even the most rigorous mathematical system might be only one of many possible alternatives. Parallel worlds or a multiverse were not ruled out by Barrow's God whose creative will was absolute.

Defining the relation between systemic mathematical necessity, causal explanations, and the physical laws of nature, Barrow writes, in Kirkby's cumbersome translation (modernised from *Usefulness of Mathematical Learning,* pp. 88-89; my emphasis):

> It is all one, as to the nature of the thing, from which the discoursus takes its rise, for which soever link of the chain you take hold of, the whole will follow; but we usually seize upon that which is most obvious and ready. It is here as in the progress of a circle, from whatsoever point of the circumference you take your beginning, you will measure over the whole. Such in reality and no other is a mutual causality and dependence of the terms of a mathematical demonstration, viz. a most close and intimate connection of them one with another; which yet may be called a formal causality, because the remaining affections [properties, effects] do result from that one property, which is first assumed, as from a form. Nor do I think there is any other causality in the nature of things, wherein a necessary consequence can be founded.

> The logicians do indeed boast I do not know what kind of demonstrations, from external causes either efficient or final; but without being able to show one genuine example of any such; nay I imagine it impossible for them to do so.
>
> For there can be no such connection of an external, e.g. efficient cause with its effect, (at least none such can be understood by us) through which, strictly speaking, the effect is necessarily supposed by the supposition of the efficient cause; or any determinate cause by the supposition of the effect. Nay, there can be no efficient cause in the nature of things of a philosophical consideration which is altogether necessary. For every action of an efficient cause . . depends upon the free-will and power of Almighty God, who can hinder the influx and efficacy of any cause at his pleasure; neither is there any effect so confined to one cause, but it may be produced by perhaps innumerable others.
>
> *Hence it is possible that there may be such a cause without a subsequent effect, or such an effect and no peculiar cause to afford any thing to its existence. There can therefore be no argumentation from an efficient cause to the effect, or contrarily from an effect to the cause, which is lawfully necessary.* . . Because there is fire it does not necessarily follow that there is fuel for it to feed on, or smoke sent from it; since history relates that, in fact, it has happened otherwise. Neither, on the contrary, is the necessary existence of fire inferred from ashes or smoke. For who doubts but God can immediately create ashes and smoke, or produce it by other means. . . Nor does the astronomer, from the height of the sun, wholly demonstrate its continuance above the horizon, or the past time of the day: for we read of the sun's having once been fixed in heaven, and another time of it going backwards. . . Without any preparatory dispositions induced into the suscipient matter, in the same manner by mere willing, saying, or commanding . . God uses no other means, instruments or applications in these productions, than his bare word or command.

It is appropriate that we are considering these texts in close proximity, as it were, to the site of Becket's martyrdom and within strolling distance of the glorious windows which celebrated the miracles allegedly attributable to Becket, though primarily to God himself. One is, of course, reminded of Galileo once again. And of Hume. But also perhaps of notions of quantum indeterminacy.

Robinson Crusoe

Perhaps Kirkby was further influenced by this element in Barrow's argument because it allowed for the possibility of 'alternative worlds' – including those of fiction. We can take a brief detour to one obvious model

for Kirkby's *Automathes*. Daniel Defoe had written in his Preface to *Robinson Crusoe*, first published in 1719:

> If ever the story of any private man's adventures in the world were worth making public, and were acceptable when published, the editor of this account thinks this will be so. The wonders of this man's life exceeds all that (he thinks) is to be found extant, the life of one man being scarce capable of a greater variety. The story is told with modesty, with seriousness, and with a religious application of events to the uses to which wise men always apply them (viz.) to the instruction of others by this example, and to justify and honour the wisdom of Providence in all the variety of our circumstances, happen how they will. The editor believes the thing to be a just history of fact; neither is there any appearance of fiction in it.

Defoe claims that his narrative is a history of fact, that he is only the editor of a true story, one that really happened, and that the extraordinary wonders which it recounts reveal, and instruct the reader in, the workings of Providence. However, if I want to claim that a narrative demonstrates the workings of Providence I can hardly admit that it's a story I have simply made up; and conversely, if I admit that the 'wonders' are pure fiction they can hardly be used as evidence for Providence. But Defoe engages in a neat double manoeuvre, reconciling the assertion of Providence and a scientific repudiation of the need for miraculous explanations of how the world works, thereby complicating the proclaimed dichotomy between 'truth' and 'fiction', or credulity and incredulity.

At one point in the novel Crusoe finds with utter astonishment that corn is growing in his compound, though he is certain he hasn't planted any there. This must, he immediately thinks, be the action of God, 'the pure production of Providence for my support', and he gives heartfelt thanks to God. But then he remembers: 'at last it occurred to my thoughts that I had shook a bag of chickens' meal out in that place, and then the wonder began to cease'. In thinking he has found a rational explanation, he stops attributing the miraculous corn to Providence.

But then, in a further twist, he almost immediately concludes that perhaps it was indeed Providence which ensured that there were a few grains in the bottom of the sack, so that the divine had in fact been working in a 'scientific' way —and accordingly he again thanks God.

It's a classic moment of oscillation between two world-views, two explanatory schemas. What Crusoe's compromise conclusion excludes, or suppresses, is the awareness that it wasn't 'God' who arranged these events: it was Daniel Defoe, who devised the whole incident in the first place, so constructed as deliberately to offer his readers competing explanations of what happened. Defoe represents himself as not in control of the narrative

at all, as only the editor of a 'true' story – unless, of course, God is also responsible for people writing fiction.

By the time we get to Henry Fielding's *Tom Jones* (1749), a generation later, Fielding is quite happy to admit explicitly that he is offering fiction. Indeed, he cheerfully claims in his opening remarks that since he is inventing this new way of writing, called the novel, he can therefore make up what rules he likes. The reader is entirely under his control, but it's for the reader's own good. Fielding will intervene occasionally, not only to arrange the events of the story, but to tell his reader what 'really' happened, despite any misleading appearances. The reader will thus become attuned to the rules of the genre and will gradually learn to make his or her own judgements in accordance with those rules—and therefore, finally, in basic agreement with Fielding's own judgements, which, necessarily, constitute the 'truth' in the world of this fiction. Not wholly unlike God's creative word in Barrow's universe(s).

Kirkby's unsuccessful novels were governed by quite other rules than those which, unfortunately for him, seemed to prevail in the actual world. Moreover, though Kirkby was influenced by his own commitment to the notion of a pure primitive Christianity (as exemplified by the imagined clergy of Soteria), Kirkby also clearly believed that though 'miracles' had once been possible, the contemporary English church had allowed itself to become so corrupted that the divine gift of miracles was clearly in abeyance. Since he articulated this position as part of his fierce polemic against the unjust distribution of ecclesiastical revenues, perhaps he was nevertheless hoping for a miracle in his own impecunious case:

> I affirm that the present regulation of the revenues of the church as managed among us has a necessary tendence to make a corrupt and immoral clergy and consequently to produce all that infidelity and contempt of religion which are so great a share in the wickedness of the present age. For when the office of ecclesiastic is accompanied with an opportunity of worldly riches, ease, and grandeur, this naturally put such persons upon seeking after it who make those things their only aim and consequently will omit no means however base and vile to attain their ends. . . But our Saviour has declared that at what times however the teachers of the gospel should thus apostasize from the true dependence he would at the same time withdraw assistance from them. And to show that he was as good as his word, he gave a convincing proof, when he actually took away from them the power of working miracles. . . When the state began to change its persecutions of Christianity into favours and encouragements then the crafty enemy of souls perceived he had another game to play. . . Henceforward we hear no more of the supernatural effects of that divine power which attended the profession of the name of Christ.

Such an analysis might even, I suggest, qualify as a curious version of a social explanation of scientific developments!

Strangely perhaps, Meric Casaubon, though willing to credit the notion of diabolical intervention, only occasionally mentioned miracles in relation to credulity or incredulity, and he seems never to have paid specific attention to the accounts of Thomas Becket's miracles which had underpinned so much of his own cathedral's revenue and sustained the credulity of its mediaeval pilgrims. Perhaps John Kirkby had considered more carefully the implications of those narrative wonders depicted in the then-neglected but still miraculous Canterbury windows which were just becoming the subject of popular guidebooks. Unfortunately for Kirkby, however, he never found the magic formula for a popular mathematics guide book.

masters of theory

Let us step back again. The seventeenth-century development of analytical geometry and the calculus, which marked a paradigm shift in the teaching of mathematics, is one reason why elementary or even high-school mathematics courses still tend to halt or falter at that boundary. The difficulty in making mathematics popularly accessible, let alone actually popular, can no longer be explained away because mathematical lectures are published in Latin or printed in almost unreadable formats. Several more substantial difficulties stand in the way of widespread understanding of mathematics.

One persistent problem is mastering the variable notations in which mathematical texts have been written and calculations conducted, the differences of symbolic notation and terminology deployed in different periods, branches, schools, and sub-disciplines in mathematics. We glimpsed earlier the frustrating 18th-century problem of dealing with multiple confusing conventions for units of measurement, and we are today familiar with the difficulty of understanding, let alone resurrecting and implementing, rapidly obsolete programming languages written for superseded and abandoned computer hardware.

Moreover, if understanding mathematics rests basically upon a 'custom' of acquiring practised familiarity with certain techniques, there may well be further problems looming. One intriguing study, *Masters of Theory: Cambridge and the Rise of Mathematical Physics* by Andrew Warwick (2003), shows that the pedagogical procedures for teaching mathematics in mid-19th-century Cambridge, which provided the context for such figures as Maxwell and Thomson, and even Dirac and Dyson, were crucially dependent upon intensive face-to-face tutoring and the perpetuation of very specific modes of instruction and examining, so that arguments formulated in the university's sometimes parochial mathematical conventions and shorthand

can now be almost unintelligible to those trained in later pedagogical traditions.

Changes in the teaching of mathematics can mean that mathematicians are no longer able to manipulate legacy calculation procedures, any more than future computers will be able to operate legacy operating system, even while a great deal of routine mathematical calculation is now performed on the basis of assumptions built into computer software which 'does the math' for us. The mathematical underpinnings of contemporary theoretical physics are the product of such an intense training that few outside a relatively restricted circle can comprehend, let alone judge, such mathematically-based hypotheses as, for example, the numerous variations of so-called string theory.

Peter Woit in his *Not Even Wrong* (2006) claims not only that the mathematical bases for some currently fashionable quasi-theories of 'strings' or 'branes' are dubiously idiosyncratic and even arbitrary, but also that the physical resources required to test experimentally the several versions of 'string theory' are sufficiently far beyond any conceivable practical implementation that in effect such theories cannot be tested at all. A cyclotron with a circumference equal to the orbit of Pluto is not an affordable option. Moreover, it seems that it is often the competitive financial demands upon the major grant foundations and government funding agencies which determine the direction and choice of possible experimentation in contemporary advanced physics. Predictably, a circle can be traced between the reciprocally reinforced status of elite academic personnel and the prestige of specific theories amid the revolving doors of funding panels, journal editors, and appointment committees. Another familiar topic in the sociology of scientific knowledge.

In Kirkby's novel, Autonous was necessarily content with whatever instruments and tools had fortuitously survived the original shipwreck, but he had nevertheless managed (he claimed) not only to reach the territory of 'speculative geometry' but to make some advances in what he calls 'the theory of numbers'. A further reason for a degree of 'common sense' bafflement concerning current mathematics is prompted by the repeated attempts since the seventeenth century to arrive at any satisfactory 'theory of numbers' or, more broadly, a coherent philosophy of the 'foundations' of mathematics.

In addition to the persistent divisions between formalists and intuitionists, those who regard mathematics as a self-sustaining and perhaps even tautological structure and those who seem to believe that fundamental mathematical notions are ultimately self-revealing, there has also been for nearly a century the shadow cast by Kurt Gödel's argument that any formal mathematical system must be either incomplete or inconsistent. It could be claimed that Godel's destructive analysis applied only to such attempted logical approaches as those of Russell and Whitehead, but this offers no reassurance to sceptics, as it leaves open the possibility that radically

alternative mathematical systems, or theoretical conceptions of them, might be just as vulnerable to intellectual auto-destruction. Gregory Chaitin, for example, would argue that at the core of all mathematical systems is an intrinsic randomness. Meanwhile, the approach of the later Wittgenstein might still be attractive. He occasionally gives the impression that, like a more adventurous imaginary traveller than Kirkby, he is merely envisaging and exploring exotic or remote tribes whose relationship to mathematics might be wholly *sui generis* yet offer a no more or less compelling rationale than ours. Mathematics, like a language game, is a matter of use or custom, to use Casaubon's terms.

Kirkby, despite his ventures into the novel territory of the calculus, or his abortive speculations on a 'new system of logic', largely operated within the traditional mathematical number domain occupied by Barrow. Since then, an extraordinary zoo has flourished, not merely comprising rational numbers, irrationals, negative numbers, but transcendental numbers, complex numbers, imaginary numbers, transfinite cardinals, and super-symmetrical 'monsters' in 196,884 dimensions, or thereabouts. Woit comments that over a million equations in 'pure math' are published every year, making it impossible to judge the significance or even validity of each in relation to the entire field.

Meanwhile, the most basic problems persist which partly drove the philosophers of mathematics into the kind of impasse which Godel demonstrated. What sense can we make of the interminability of **π**, its latest calculation currently standing at some 10 trillion decimal places, or even the basic incommensurability of diameter to square? Euler's beautiful but weirdly inevitable integration of **e, i, π,** 1 and zero in the fabulous 'identity' equation can be celebrated, while on the other hand, as Martin Rees's *Just Six Numbers* long ago pointed out, we seem to have no way of correlating the most crucial numbers which shape the fundamental physical features of our universe, of explaining how those basic numbers 'fit together': **N, λ, ε, Ω, Q, D**.

Peter Atkins in *Conjuring the Universe* argues that each of these apparently enigmatic numbers can be recalibrated into temporal units of seconds and thereby reconciled. At the expense of re-casting our entire system of measurement but with the prize of calculating that the universe can be simply conjured into reality from (his phrase) 'nothing very much'.

More generally, if what we understand by modern science stems from a convergence or combination of 'mathematics' and 'experiment', it frequently seems that it is predominantly commercial profit and not scientific inquiry which organises current programmes of innovative experimentation, seeking cutting-edge developments in the chemistry of cosmetics or pet food, while the state-funded perpetual refinement of military hardware reminds one of the reviewer's old complaint that the work under review unfortunately fills a very useful gap.

Overall, nevertheless, there is a continual and bewildering accumulation of new experimental results across almost every domain of science. Consider this more or less random scatter of fairly recent headlines: Largest prime number discovered. Most distant star ever seen. Satellite-based entanglement distribution over 1200 kilometers. Evidence of a new elementary particle. Cern experiment hints at new force of nature. Astronomers and physicists getting signals from a shadow universe of dark matter that has eluded direct detection until now. Proposals for a $600 million satellite mission devoted to dark energy. Researchers have demonstrated a 'time telescope' that could squeeze much more information into the data packets sent around the internet. Microscope with 50-nanometre resolution demonstrated. Flat lens promises possible revolution in optics. Scientists a step closer to developing materials that could render people invisible. And so on. Meanwhile: 'Neanderthals' large eyes caused their demise'.

Yet still, to come back to the mediaeval memorial which prompted these considerations, if we ask today the two interconnected questions which John Pecham debated, we still have no agreed or even comprehensible accounts of the relationship between the 'big bang' and the nature of time, or the possible or impossible appearance of everything from nothing. Pecham could write a more or less up-to-date textbook on optics intended for a then-introductory level of clerical education. But the abyss today between most people's knowledge of, or competence in, mathematics and that of working scientists and professional mathematicians has drastically widened. At the simplest level, few of us can "do the maths". Nor is this simply a matter of 'translating' the maths into some 'easier' version, let alone into 'ordinary language'. This involves not just a variation on whether Newton originally conceived of the *Principia* in terms of the calculus or algebra and then, to make it more accessible, presented the work more in terms of geometrical diagrams. The task of 'translating' between domains of science specialisms can now itself be problematic.

Famously, Paul Dirac tried to provide a way of partially relating relativity and quantum mechanics by formulating a reciprocal translation of each into the other at the strictly mathematical level. Dirac's obsession from his earliest acquaintance with mathematics and physics had been to translate, or recalculate, classical mechanics into relativity terms. Almost persuasively, one biography draws attention to Dirac's characteristic social silences, his almost pathological avoidance of ordinary casual chatter, as partly stemming from the fact that Dirac grew up in a household where his father insisted on speaking French while his mother could only speak English to him, so that the boy even thought men and women spoke different languages. His father was also an ardent advocate of Esperanto. It's plausible that Dirac wanted to speak at all only in the Esperanto of maths. Meric Casaubon might have been intrigued, given his interest in how one 'language' translates into another, in the *De usu verborum* and *De quatuor linguis*, while Kirkby would

have recognised his self-taught mathematician who could speak no language at all until rescued.

Yet while the relation between geometry and calculus or classical and quantum mechanics can be formally conceived in terms of attempted 'translation' from one mode of mathematics to another, this doesn't explain what the mathematics is "saying" in the first place, any more than translating from French into English or Esperanto clarifies in itself what is being said in either language. In Cambridge in the 1900s Whitehead and Russell tried to translate mathematics into logic and vice versa while for Wittgenstein problems in the philosophy of mathematics were entwined with those in the philosophy of language. His first approach had also been to try to translate both into a form of logic, and one way of tracing the history of his attempts is to see a shift from syntactic structures in the early Wittgenstein towards the notion of language games or social semantics in the later Wittgenstein. The problem lurking for all these efforts became apparent when Kurt Gödel took the step of in effect translating the symbolic logic of the *Principia Mathematica* into itself, of applying the same rules to meta-logical structures as to logical structures themselves. In a not dissimilar move Jacques Derrida was to lay bare the anomalies, aporias, and self-cancelling operations implicit in post-Saussurean structuralist notions of language. Derrida's starting point had after all been in some respects Husserl's essay on the origins of geometry.

As Wittgenstein pithily remarked in *Remarks on the Foundations of Mathematics:*

> Everything that I say really amounts to this, that one can know a proof thoroughly and follow it step-by-step, and yet at the same time not *understand* what it was that was proved. [3rd edition, p. 282]

His own perhaps unpersuasive comment is:

> Now when does one understand it? – I believe: when one can apply it.

In the 1939 *Lectures on the Foundations of Mathematics*, which Alan Turing attended, Wittgenstein was perhaps less sanguine about this approach (Lecture XI, p. 110):

> Think of disputes about transubstantiation. It is not true that if someone had said to Luther and Zwingli that the meaning of the word 'wine' is the method of its verification, they would have said, "Oh, now I see" and stopped arguing. On the contrary they might have killed you – and perhaps rightly. That is, I'm not saying that they would be behaving stupidly.

tracing a line

It's time to return to Pecham as the starting point for these ramifying considerations. My comments so far on Pecham, Casaubon, and Kirkby have concerned particular problems which might be seen as resolvable, but I want now to probe more directly some less tractable issues. My focus will be on that almost taken-for-granted figure: the line. You might recall the quotation from Descartes earlier: 'All the problems of geometry can easily be reduced to such terms that thereafter we need to know only the length of certain straight lines in order to construct them.'

What characterised Pecham's diagrams was an arrangement of lines, and we can ask what those lines stand for or represent. I want therefore to trace a line, as it were, from Pecham's geometrical optics to some later scientific developments, and instead of the three minor or neglected writers I have so far considered I will attempt to bring into play, however inadequately, three major figures: Newton, Maxwell, and Feynman – none of whom, admittedly, had very much to do with cathedrals, though Newton's co-authorship was long claimed for the highly useful handbook:

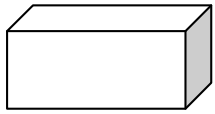
> *Tables for renewing and purchasing of the leases of Cathedral-Churches and Colleges, according to several rates of interest; with their construction and use explain'd. Also tables for renewing and purchasing of lives. . . Very Necessary and Useful for all Purchasers, but especially those who are any way concerned in Church or College Leases.*

This was published in several editions under the joint names of George Mabbut and Isaac Newton. Kirkby in particular might have hopefully consulted it.

Clearly, however, the general implications and impact of post-mediaeval science has been of considerable significance for the very rationale of cathedrals. It is difficult to sit in Canterbury's nave or wander its monastic remains and not be aware of differences between the world-view which constructed them and the conceptual universe we inhabit today. Yet we can perhaps approach those differences through some elements of continuity, not least the complex relations between seeing and believing. Or perhaps 'seeing-as'. We can first return to Wittgenstein and to Pecham, but also with Kirkby's mathematical 'cuts' in mind.

In the *Philosophical Investigations* Wittgenstein wrote (II xi, p.193e):

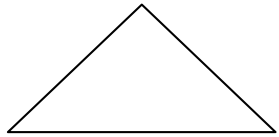
> You could imagine the illustration



appearing in several places in a book, a text-book for instance. In the relevant text something different is in question every time: here a glass cube, there an inverted open box, there a wire frame of that shape, there three boards forming a solid angle. Each time the text supplies the interpretation of the illustration.
– But we can also *see* the illustration now as one thing now as another.
– So we interpret it, and *see* it *as* we *interpret* it.

And again:

This triangle can be seen as a triangular hole, as a solid, as a geometrical drawing; as standing on its base, as hanging from its apex; as a mountain, as a wedge, as an arrow or pointer, as an overturned object which is meant to stand on the shorter side of the right angle, as a half-parallelogram, and as various other things. (IIxi, p. 200e)



In the opening remarks of his *Perspectiva communis*, Pecham wrote:

A while ago at the request of associates I wrote certain unpolished mathematical essays . . Among the investigations of physics, light is most pleasing to students of the subject. Among the glories of mathematics it is the certitude of demonstration that most highly exalts the investigators. Therefore perspectiva is properly preferred to the traditional teachings of mankind, since its demonstrations are devised through the use of radiant lines and in which glory is found physically as well as mathematically [*in qua tam physice quam mathematice gloria reperitur*], so that perspectiva is adorned by the flowers of both.

His *Perspectiva communis* thus offers supposedly 'mathematical exercises' in which 'demonstrations are devised through the use of radiant lines' which, he implies, have 'the certitude of demonstration'. The 'radiant lines' are deployed so that 'light' can be represented by lines drawn on a page.

Pecham acknowledges there may have been 'great obscurity' in previous attempts:

> I shall compress into concise summaries the teachings of perspectiva, which [in existing treatises] are presented with great obscurity, combining natural and mathematical demonstrations according to the type of subject matter, sometimes inferring effects from causes and sometimes causes from effects. . .

Leaving aside what are 'causes' and 'effects' in this context, how does one 'combine' 'natural' and 'mathematical' demonstrations using only words and lines on a page, and can such writing and drawing really involve the certitude of 'mathematical demonstrations'? In Pecham's diagrams reproduced earlier, how can the 'mathematical' and the 'physical' be related merely by drawing several lines on a page? What of Wittgenstein's implication that any such line drawing is susceptible to quite different interpretations, to being variously 'seen-as'.

We are familiar with the Renaissance deployment of 'perspective' drawing to compose a more 'realistic' representation of what we see, a claim which can obviously be challenged, but Pecham's use of lines is not in that sense an attempt to show what we actually see. We may now readily regard the presentation of single lines, drawn on a page, as denoting 'rays' of light. Yet the almost paradoxical feature of diagrams in a treatise on optics is that they are apparently representing something through and by which we see, yet there is a sense in which we do not see that light itself. Light is what fills our field of vision but we do not normally see it as individual rays of light. Looking at objects in a room or landscape, I don't see the light itself, though I might see a lamp or window as the source of light by which I am seeing, and I will see that the room or terrain is lit, perhaps with contrasts between darker and lighter areas, including shadows. When we look directly at ourselves in a mirror we don't see any 'rays' of light by which we see ourselves, and even if we set up an apparatus which shows us how a mirror reflects our image at various angles, we do not see that image as visible anywhere except 'in' the mirror, even if it looks as if it is located somewhere else. What we are seeing is (the virtual image of) what is lit, not the light itself. Yet we are so used to 'seeing' light *imaged* as a line or ray that we can forget that the light radiating from a source might be more plausibly drawn as an expanding cone, a pyramid, or a radiating sphere. Yet we don't see those either.

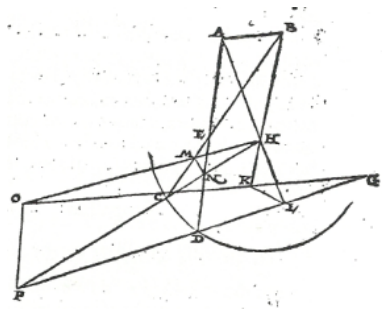
At issue here is a difference between defining 'seeing' as what happens when light activates a retinal reaction, and regarding 'seeing' as a matter of our experiencing. My retina reacts to light and that is 'seeing' by one definition. So a 'light ray' is 'there' but not 'visible' to me. Put another way, which sense of 'see' do we put in inverted commas or scare quotes? By providing a drawn line, Pecham's diagram creates a visible form for an

'invisible' object or process and the drawn line of a 'ray' is as schematic as a curved line representing a physical mirror, yet the mirror is visible in a way that the ray is not.

The normal way we see *in* the light is not to see the light itself, let alone any pencil-thin 'rays', despite occasional striking visual effects, such as sunsets or storm clouds when 'rays' appear as streaming through a vivid sky, a favourite subject for post-Romantic painters. There was a mediaeval tradition of attempting to paint a kind of 'visible light', as in the depiction of a saint's halo as a shimmering and transparent circle of light, or a shaft of divine light descending upon and impregnating the Virgin Mary in representations of the Annunciation, or a heavenly light falling onto Christ at his baptism. As suggested earlier, we could pursue in some detail the painting of light in religious and landscape painting, including the familiar motif of light 'streaming' through windows in Dutch paintings, or Monet trying to paint the light 'between' his eyes and the facade of Rheims cathedral. But the light through which we see remains distinct from what it enables us to see, and the point was made from at least Aristotle onwards that what we actually see is normally not luminosity itself but colour, as the visible effect of what the light strikes upon. (Aristotle was not in a position to investigate the differences between sunlight and monochromatic light, and lasers had not been invented.)

Classical and mediaeval explorations into optics demonstrated that light can however be made visible. You can darken a room and make a pinhole aperture so that a very narrow line (ray, beam) of light does indeed become visible in the otherwise dark room. Which is precisely what Pecham did, and many others before and after him, including Newton. It is a kind of extrapolation from that 'ray' which becomes the 'line' represented in a diagram. Centuries later, we can now use a light pointer, a laser beam or, in a related but much more developed apparatus, a beam of electrons in a cyclotron or cloud chamber in order to make visible the tracks of the normally invisible.

However, look again for example at the diagram for Book II, Proposition 50, here taken from the 1542 edition, with a 'curved mirror' at C, D,



There are obvious questions. As with looking at a painting, one might ask about the 'viewpoint'. From where are *we* 'looking' *at* this setup? We can locate the viewing position (A?) within the diagram but we are not seeing the diagram *from* that position, a point-of-view perspective. A line of light would not in any case be visible to us if we were looking directly *along* it. We are presented with a complicated flat plane two-dimensional drawing, though we know that 'light' illuminates in three dimensions, even if a 2-D drawing doesn't clearly indicate three dimensions.

In any case, we can recall another remark in Wittgenstein's 1939 lectures on mathematics:

> Frege, who was a great thinker, said that although it is said in Euclid that a straight line *can* be drawn between any two points, in fact the line already exists, even if no one has drawn it. The idea is that there is a realm of geometry in which the geometrical entities exist. What in the ordinary world we call a possibility is in the geometrical world a reality. In Euclidean heaven two points are already connected. This is a most important idea, the idea of possibility as a different kind of reality; we might call it a shadow of reality. We multiply 25 x 25 and get 625. But in the mathematical realm 25 x 25 is already 625.

And, long before him, Aristotle in *Metaphysics B 2*, 997b34:

> Astronomy cannot be dealing with perceptible magnitudes nor with this heaven above us. For neither are perceptible lines such lines as the geometer speaks of (for no perceptible thing is straight or round in the way in which he defines 'straight' and 'round'; for a hoop touches a straight edge not at a point, but as Protagoras used to say it did, in his refutation of the geometers), nor are the movements and spiral orbits in the heavens like those of which astronomy treats, nor have geometrical points the same nature as the actual stars.

A relationship between the 'mathematical' and the 'physical' might be considered in terms of the combination of elements we are looking at in such diagrams. There is the 'pure geometrical' element: an organisation of drawn lines which represents, as in Euclidean geometrical convention, a relationship between lines, angles, and points, which might permit us to calculate a geometrical 'demonstration'. Such abstract geometry itself had arguably developed out of the representation of specific kinds of physical object, an area of land, a journey from one place to another, a rope stretched from A to B. But the lines in geometry are 'ideal' lines and we can be surprised to see such 'geometric' lines given shadows and colours, as in a deluxe edition of Archimedes in 1615 by Rivault which had coloured diagrams with elaborate shading effects. Again, recall Kirkbys's comment on shaded diagrams.

In some optics diagrams there may be a representational indication of a 'real' or 'material' element, for example a small icon of an eye, or perhaps a schematic tree, a miniature church-spire, or the pointed peak of a mountain, representing either the object looked at or a postulated standpoint from which something is to be seen. The apparatus involved in an experiment might be schematically represented by lines, as in the curved line for the mirror in Pecham's figure for Proposition 50.

The problematic element is the 'imaginary' lines which represent a ray of light and/or a line of sight. For example, by drawing a line *from* a small icon of an 'eye' *to* an 'object' (or simply a line drawn from the letter A to the letter B) we might represent a 'line of sight' or 'visual ray', whereas by drawing a line *from* the object *to* the eye (from B to A) we might represent a 'light ray'. Yet this can be the 'same' drawn line on the page, and since there may be no directional arrows on the drawn line its status can be ambiguous or two-fold. As in Wittgenstein's comment on the triangle, what the 'line' represents depends upon the conceptualisation or explanation of 'sight' which the diagram is intended to clarify or support, whereas the line itself is not self-explanatory.

Now consider Pecham's comment on 'ray' in *Perspectiva communis* Part I, Proposition 27:

> A ray is nothing but the 'species' of a visible object fashioned into a straight line by extension. Nevertheless, chiefly luminous bodies are said to radiate (and especially the Sun, whose rays are sensible) because with their rays they illuminate other things.

Pecham acknowledges that his drawn lines 'represent' straight uni-directional single rays but that sunlight radiates in every direction, a sphere of light, and is indeed an ambience, perhaps somehow consisting of an 'infinite' number of 'rays' (though it is unclear what we are representing *between* the diverging rays).

It is an artifical or experimental device, he acknowledges, to single out just one ray. The drawn 'ray' is not itself a 'physical' object but, for him, the track of a 'species' which is not itself visible *en route*: in this theory, we can't see and don't register a 'species' until it arrives at the eye. Yet the line drawn on the page is itself a physical object which can be extended, manipulated, moved, and erased.

In classical and mediaeval optics there was a dispute between two different models of light and of sight. Roger Bacon for example regarded a 'species' as a kind of manifestation of an object and his notion of the 'multiplication of species' implied something at least quasi-physical, something which actually travels, goes from A to B, or possibly propagates a series of intermediate or successive 'species', each prodding into motion or even existence the next 'species', perhaps somehow formed from the air

itself, and eventually producing the quasi-corporeal form which finally has an impact upon the eye.

One might claim that this notion is no more odd or incredible than James Clerk Maxwell's notion of electromagnetic waves invisibly propagating themselves, especially bearing in mind that what Bacon meant by 'species' includes all forms of emanating 'power' or 'force' which an object might generate, and perhaps not so very different from the notion of 'photons' travelling and striking off electrons when they hit a surface. This issue was entangled with the controversial problem of whether vision was to be explained in terms of intromission or extromission: whether the species was emitted from the object to eventually enter the eye or somehow the eye reached out to capture and bring back the species. Pecham like Al-Hazen was firmly of the intromission camp.

That particular controversy no longer exercises us: we assume that light comes *to* the eye, not that some force emanates from the eye to the target object. Nevertheless, we still tend to represent vision as a line (or cone) stemming *from* the eye *to* the object, for example in an illustration of someone looking at a picture or of an observer pointing a telescope. When a cartoonist depicts Superman's x-ray vision or the killer eye-sight of the super-powerful villain we have a residual version of the extro-mission notion of light: a power that comes *out of* the eye-ball. Normally, in fact, if we draw a line to represent the act of looking, in which direction do we draw it? And what precisely are we then drawing?

The renaissance artists who adopted 'perspective' as a way of supposedly providing a more 'realist' representation, by using an intermediate screen constructed as a lattice of squares between the observing eye and the scene to be depicted, could largely bypass this controversy because on either model the same lines would be drawn. But when they represent an artist working at his perspective table they too, as in Durer's famous illustration, represent a visual ray going from the eye through the grid to the scene being drawn. Durer gives detailed instructions on how to draw lines of sight from the eye to the object in his 1525 *Unterweysung Der Messung*, as (controversially) explicated by William Ivins in his *On the Rationalization of Sight* (1938 /1973) . As it happens, the very notion of a 'visual ray' may be partly due to a mistranslation. A passage from Aristotle's *De generatione animalium* (Book V, I, 780a5ff) was sometimes cited as the authority for a ray of light, yet the apparent reference to 'visual rays' was probably a mediaeval mistranslation by Michael Scot which gave support to an extromission theory.

All this may well be regarded as merely elementary or obvious, and certainly as somewhat remote from thinking about contemporary scientific issues today. But let us move forward by a few centuries to the textbook which replaced Pecham's *Perspectiva communis*.

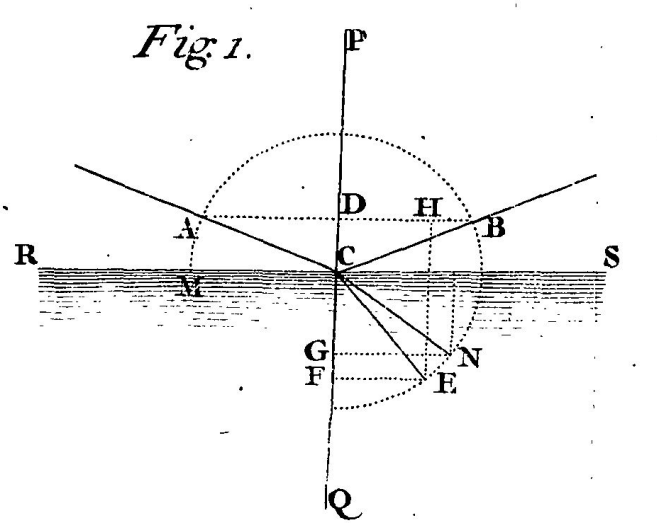
Newton's lines

Isaac Newton's first Definition in his 1704 *Opticks: or, a treatise of the reflexions, refractions, inflexions and colours of light* is:

> *By the Rays of Light I understand its least Parts, and those as well Successive in the same Lines, as Contemporary in several Lines.* For it is manifest that Light consists of Parts, both Successive and Contemporary; because in the same place you may stop that which comes one moment, and let pass that which comes presently after; and in the same time you may stop it in any one place, and let it pass in any other. For that part of Light which is stopp'd cannot be the same with that which is let pass. The least Light or part of Light, which may be stopp'd alone without the rest of the Light, or propagated alone, or do or suffer any thing alone, which the rest of the Light doth not or suffers not, I call a Ray of Light.

The very first diagram in the *Opticks* is given below. Newton glosses the diagram:

> Suppose . . that RS represents the Surface of stagnating Water, and that C is the point of Incidence in which any Ray coming in the Air from A in the Line AC is reflected or refracted, and I would know whither this Ray shall go after Reflexion or Refraction.



The diagram is supposedly self-explanatory. But I want to draw attention to two aspects of it. The horizontal line RS is not drawn as just a single line

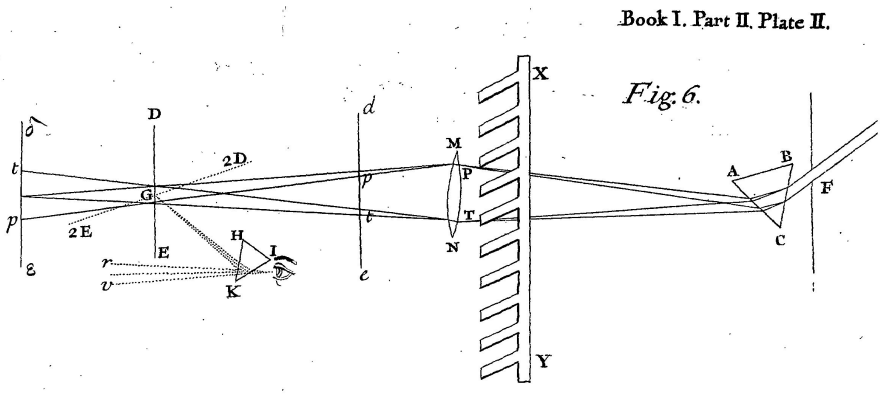
since there is a somewhat half-hearted attempt to depict the water as a real surface, almost with traces of waves, despite the description as 'stagnating' – a residual recognition that the water is not simply an abstract line.

On the other hand, the line AC which is then refracted by the water to CN or CE is ambiguous. We can register the refraction of light by observing, for example, how a stick appears to 'bend' as we view it entering the water and remaining visible beneath the surface, and this could be represented by a drawn 'stick' following the angle in the overall line from A through C to E or N. But do these lines represent how a stick or rod would appear to us, though without it actually bending, or could we see a light beam or ray, first in the air and then in the water, but itself 'really' bending? You might bear this visual ambiguity in mind for later.

A more complex diagram or illustration from the *Opticks* can more clearly recall Pecham's 'combination' of physical and mathematical elements. The diagram below depicts a version of Newton's prism experiment, Experiment X, in Book 1, Part II, Figure 6.

As with Pecham's diagrams, it may take some time to follow the accompanying prose passage by constructing a kind of progress of the lines as traced in the diagram. Especially since Newton's printed diagram, like mine, is not coloured.

But the illustration as a whole also acts as a form of instruction on how to construct and conduct the experiment for oneself, including drawing this arrangement for oneself.



We can fairly easily 'read' this, once we have deciphered the relations between letters and lines. There is a small icon of a eye (at the letter I, lower left) and a source of sunlight (through a gap at the letter F in a wall represented as a single vertical line, on the far right of the diagram). A number of drawn lines variously link the 'aperture' at F and the 'eye' at I. The curious vertical drawing between X and Y represents a 'comb' which

was used by Newton to filter out or block off various separable colours stemming from the prism at ABC (the teeth of the comb performed the same physical function as Young's thin cards or Pecham's cut-outs). The three short vertical lines at DE, at *de*, and at *δε*, depict a sheet of paper which could be moved to three different positions and onto which the continuous lines from F through the prism and then through the curved lens (shown at MPTN) converge or impinge. The angled dotted line at 2E-G-2D towards the left of the diagram is glossed by Newton as follows:

> And if the Paper be placed at the Focus G, and the white round Image at G be viewed through the Prism HIK, and by the Refraction of that Prism be translated to the place *rv*, and there appear tinged with various Colours, namely, the violet at *v* and red at *r*, and others between, and then the red Colours at the Lens be often stopp'd and let pass by turns, the red at *r* will accordingly disappear, and return as often, but the violet at *v* will not thereby suffer any Change. And so by stopping and letting pass alternately the blue at the Lens, the blue at *v* will accordingly disappear and return, without any Change made in the red at *r*. The red therefore depends on one sort of Rays, and the blue on another sort, which in the Focus G where they are commix'd, do not act on one another. And there is the same Reason of the other Colours.

Clearly, the continuous near-horizontal lines are meant to represent the trajectory of the light from the aperture at F and they 'travel' from right to left, though the diagram itself does not indicate a direction. Less clear are the functions of the dotted lines linking the angled 2E-G-2D and the eye icon at I. G is a point at which we are told that there appears a 'commix'd' 'white' light and that 'the white round image at G' can be 'viewed through the Prism HIK'. Yet there is no 'paper' at the position *rv*, onto which the dotted lines are represented as projected. It is particularly unclear as to which direction those dotted lines 'travel' and one might even suggest that Newton has here partly deployed the representation of 'visual rays' (*from* the eye *to* the position at *rv*) rather than drawing 'light rays' as in the rest of the diagram. Moreover, those continuous light rays or lines are schematically represented by lines upon the page as if they had the same status in reality as the physical apparatus, the wall, the comb, prisms, lens, pieces of paper, and the eye itself. The drawing itself makes no distinction.

Yet what would you actually see if you were in the room? If you were situated at the position from which you are apparently looking at the diagram, you would see (in the partial dark) the items of the apparatus, and you would perhaps see a narrow beam entering through the aperture in the wall. By variously moving your position, you could try to see the different colours visible on the sheet of paper in its three different positions. You would also see the 'white' blob on the paper at G. However, you would not see what the eye at the point 'I' was seeing at *vr* unless you took up that

position of the I (eye) within the actual room itself – but at the expense of not being able to see the rest of the apparatus at the same time.

Would you see the 'light lines' themselves as Newton has drawn them, and would you see the various prism-separated colours 'travelling' from one spot to another across the room as separable but adjacent coloured lines? You might have to set up the apparatus and do the experiment yourself to answer these questions. (Recall Wittgenstein: 'Now when does one understand it? – I believe: when one can apply it'.)

However, if you then opened a window to let the full sunlight in, would you see any 'light lines' at all 'travelling' across the room? What, incidentally, would this diagram itself look like if the various lines were appropriately coloured? Remember that if you look at a rainbow you see various colours at the apparent location of the rainbow, but you don't see variously coloured light rays travelling to your eyes – a phenomenon which intrigued mediaeval writers on optics.

A further question arises: what is it that is 'travelling' along those lines anyway? In the diagram, the lines representing 'light' are as static and fixed as the physical objects represented, yet we assume that the light, far from being immobile like the comb or the prisms, is 'continually' entering through that aperture in the 'wall', so the drawn 'lines' trace something moving, even if nothing in the diagram indicates that. But what is moving, and where does that light 'go'? Newton's elaborate diagram suggests the problems it raises but does not resolve them by its drawing of various lines.

According to Newton's definition quoted earlier, light can be divided into 'Parts', including what he would call 'corpuscules', and his comment here anticipates the later exploration of light as a particle. Eventually in the modern double-slit experiment even a 'single' 'photon' can be directed at two very narrow slits, with the notorious puzzle as to how that single photon somehow creates an interference pattern, apparently with itself, at the eventual target surface. It is, one might note, impossible to draw the 'line' of that single photon as it travels to, through, and beyond the double slit. Its 'path' may be not only invisible but perhaps unimaginable. Even, incidentally, as a 'wave'.

Newton's corpuscular theory of light may be as ambiguous concerning the 'physical' character of light as Bacon's notion of a 'species', since what Newton meant by 'body' or 'matter' is notoriously problematic. For example, in a draft for the *General Scholium* in the *Principia* he recognises that we perhaps have no more idea of the 'substances and essences' of things than 'a blind man has of colors':

> We do not know the substances of things. We have no idea of them. We gather only their properties from the phenomena, and from the properties what the substances may be. That bodies do not penetrate each other we gather from the phenomena alone; that substances of different kinds do not penetrate each other does not at all appear from

> the phenomena. And we ought not rashly to assert that which cannot be inferred from the phenomena. (Hall & Hall, *Newton Unpublished Scientific Papers,* p. 360-1)

The distinction made earlier between the several elements in an optical diagram – the geometrical, the physical, and the imaginary – is difficult to maintain when the very notion of the real, the material, the physical, is itself problematic, as we shall shortly see.

There is a minor experiment recorded by Newton which I think would have pleased Pecham. Inquiring into the claim that 'The Perfection of Telescopes is impeded by the different Refrangibility of the Rays of Light', in the *Opticks* Book I, Part 1, *PROP.* VII. Theor. VI., at Experiment 16, Newton recorded:

> This Spectrum I cast on a printed Book, and placing the above-mentioned Lens at the distance of six Feet and an Inch from this Spectrum to collect the Species of the Illuminated Letters at the same distance on the other side, I found that the Species of the Letters illuminated with Blue were nearer to the Lens than those illuminated with deep Red by about three Inches, or three and a quarter; but the Species of the Letters illuminated with Indigo and Violet appeared so confused and indistinct, that I could not read them . .

Notice that Newton is here using not only an 'illuminated manuscript', perhaps in both senses, but also the term 'species'. But was he wearing glasses to read the manuscript?

drawing a line

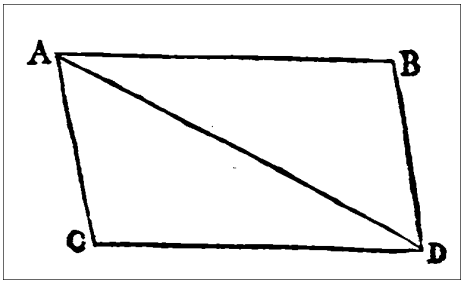
When we look at Newton's and Pecham's optics diagrams we have in practice learned (by 'use and custom') to differentiate between those geometrical lines we don't 'see' at all except on the page, those which represent some material apparatus, and those we recognise as 'imaginary' or ambiguous in their representation of, for example, a 'line' of light or 'line' of sight. But what happens to this ambiguity when we follow Newton further?

Though Newton's *Opticks* was finally published only in 1704, considerably after the *Principia***,** the lectures and experiments which had underpinned the *Opticks* preceded the work which led to the *Principia*, and arguably acted as a kind of model, especially in relation to the function of diagrams.

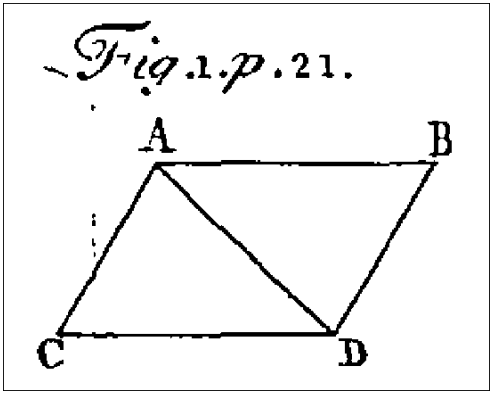
In going from the *Optics* to the *Principia* we are obviously moving into a different territory, that of mechanics. It would be distracting but tempting here to consider the contribution to the early science of mechanics by another mediaeval Archbishop of Canterbury, Thomas Bradwardine, who was active in the 'Merton circle' of 'Oxford Calculators', including William

Heytesbury, Richard Swineshead, and John Dumbleton. But Bradwardine, although buried in Saint Anselm's chapel within the cathedral, was Archbishop for only forty days in 1349, so I will by-pass him. Somewhat reluctantly, but no doubt to your relief .

In any case, my point can be pursued by again looking critically at lines in a diagram, indeed the very first diagram in the *Principia* (1689):



Or in the Motte translation of 1729:



This is a simple parallelogram with a diagonal, but these lines are related by Newton not to lines of light or sight but, it seems, to lines of 'force', and at least implicitly also to lines of 'time'. The sketch is accompanied by Corollary I (in Motte's translation):

> *A body by two forces conjoined will describe the diagonal of a parallelogram, in the same time that it would describe the sides, by those forces apart.*
> If a body in a given time, by the force *M* impressed apart in the place *A*, should with an uniform motion be carried from *A* to *B*; and by the force *N* impressed apart in the same place, should be carried from *A* to *C*; complete the parallelogram *ABCD*, and, by both forces acting

> together, it will in the same time be carried in the diagonal from *A* to *D*. For since the force *N* acts in the direction of the line *AC*, parallel to *BD*, this force (by the second law) will not at all alter the velocity generated by the other force *M*, by which the body is carried towards the line *BD*. The body therefore will arrive at the line *BD* in the same time, whether the force *N* be impressed or not; and therefore at the end of that time it will be found somewhere in the line *BD*. By the same argument, at the end of the same time it will be found somewhere in the line *CD*. Therefore it will be found in the point *D*, where both lines meet. But it will move in a right line from *A* to *D*, by Law I.

We can ask some questions about these apparent lines of 'force'. Do the two lines AB and AC represent, respectively, a 'force' M to be envisaged as in some sense operating between points A and B, while a similar 'force' N is operative between points A and C, so that the two 'lines' operating together indicate the possible movement of a 'body' (which is not itself represented except perhaps as a single dot?) initially located at point A upon which these two forces M and N 'impress'? Thus, it seems, the (unseen) body in question (let us label it W) actually moves only along the line AD, while the lines AB and AC indicate directions in which the object W *could* or *would* have moved. But in order to 'impress' upon W at point A, would those forces M and N have also operated before their conjuncture at point A, as the phrase 'impressed apart' might imply, or are they envisaged as somehow being initiated only at or from point A?

Unless that initial 'impressing' was somehow instantaneous, spontaneous, and simultaneous at point A, the 'lines of force' of M and N would surely have had to be drawn as also (previously?) converging upon, not only as diverging from, point A (where W was initially located). It is also odd that Newton writes: 'therefore at the end of that time it [W] will be found somewhere in the line BD' and also 'at the end of the same time it will be found somewhere in the line CD', since his argument is that the body, far from being 'found' on both lines, does not in fact travel along either line, while the claim that D is 'on' both lines ('it will be found in the point D, where both lines meet') seems problematic once we recall that the lines in question are only possible or potential directions and that it would have been initially at A, not finally at D, that the lines of force actually 'met' in order to propel W in the first instance along line AD. We might even wonder whether the reference, taken literally, to 'found somewhere in the line BD' implies that the 'body' could have somehow turned the bends or corners at B and C, like a reflected light beam, or indeed that W might even have multiplied itself and followed both tracks in some ghostly fashion. We might also raise a question about the implicit representation of 'time' as a line, particularly if the diagram is seen as a square viewed askew, but I leave that issue for now, while mildly suggesting that the 'squared' in Einstein's mc^2 is already lurking.

Surely, however, it is perfectly obvious, one might indignantly claim, what Newton is drawing. My queries should be dismissed as mere quibbles, a perverse or audacious questioning of a diagram for a familiar corollary which any school text-book would properly regard as wholly unproblematic. Yet this is to forget that for two centuries or so this very corollary and its diagram were the subject of prolonged controversy, focussed on how Newton's apparently obvious argument might be *proved*, or whether it could be proved at all. Can this quasi-geometrical drawing or simple representation operate as itself a proof or 'demonstration', to use Pecham's term? Or are we to regard it as self-evident, as encapsulating an already agreed axiom? The dispute was partly between, if you like, a statics and a dynamics explanation, and also a variation upon a long disagreement between two conceptions of geometrical diagrams in terms of 'progressive' or 'realised' diagramatisation, touched upon earlier in relation to constructing or merely following Pecham's diagrams. But there was also an underlying uncertainty as to what it meant to represent a line of 'force' at all.

The various nineteenth-century attempts to prove Newton's corollary have been traced in impressive detail by Marc Lange, in 'A Tale of Two Vectors' (*dialectica* Vol. 63, N° 4, 2009). He particularly discusses a diagram which he reproduces from the extended (and some said futile) attempt by Duchayla in 1804 to prove what may seem 'obvious' in Newton's corollary. Duchayla was, in part, attempting to incorporate the implications of the Second Law (of equal and opposite reaction) into the overall 'balance' or equilibrium of forces in play. Which potentially introduces the problem of an infinite regress, as each 'line of force' generates an opposite reaction. One might add that a visual ambiguity in Newton's original diagram and in Duchayla's diagram also raised a question concerning the dimensionality of Newton's diagram: do all the forces operate in the same plane, and what happens if we rotate one or more of them in three-dimensional space, or indeed in space-time (an issue which will also haunt later developments).

Lange summarises the following responses to Duchayla's attempt, indicating by his multiple references the extent of the nineteenth-century debate:

> Some regard Duchayla's explanation as 'very simple and beautiful' (Mitchell, Young, and Imray 1860, 47; cf. Earnshaw 1845, v; Pratt 1836, 7). Others, while admitting that the argument is sound, consider it: 'forced and unnatural . . a considerable waste of time' (Besant 1883, 581; cf. Lock 1888, 155); '[t]he proof of our youth . . now voted cumbrous and antiquated, and only retained as a searching test of logical power' (A.G.G. 1890, 413); 'brainwasting . . elaborate and painstaking, though benumbing' (Heaviside 1893, 147); and (my favorite) 'certainly convincing . . but . . essentially artificial . . *cunning* rather than honest argument' (Goodwin 1849, 273).

After such extended disagreements it might be difficult to sustain the view that Newton's first diagram is unproblematic. However, one criticism which particularly intrigues me is thus summarised by Lange:

> The second deficiency that critics identified in Duchayla's explanation is that it derives the parallelogram law's holding with regard to direction separately from its holding with regard to magnitude. Though it uses the former result to arrive at the latter, it requires additional steps to do so. As Harvey Goodwin says:
>
> > [T]he extreme simplicity of this part of the proof [i.e. the extension to magnitude] shews how intimate the connexion must be between the two parts of the proposition, a connexion which I think we should not have been led to expect from anything occurring in the proof itself . . [From the proof of the parallelogram law's holding with regard to direction] there is not a shadow of a hint that . . the law will hold as respects magnitude: so that a very remarkable proposition is proved by a mere artifice without apparently the least reason in the nature of things why we should anticipate the result (Goodwin 1849, 273).
>
> As Goodwin sees it, Duchayla's proof, while sound, mistakenly depicts as *coincidental* the fact that the parallelogram's diagonal represents the resultant in *both* direction and magnitude.

This is a gloss on Duchayla's almost casual remark:

> Let *AE* extend *AD* in the opposite direction, its length representing the resultant force's magnitude.

Which returns us to the issue of what Newton's own lines 'represent' in the first place. How are length, force, direction, time, and magnitude all 'combined' in these simple lines? Is it that the lines are fundamentally ambiguous in what they mean or measure? Should we, for example, compare Newton's diagram with the tracing on a map of possible or hypothetical routes for a journey taken either diagonally across or around the perimeter of a landholding? Or are we to think of a physical rope which if stretched from A to D via C or via B would be longer than one which went directly from A to D? Or do we imagine a tug-of-war competition with two ropes jointly attached to a movable cart at A, one pulling towards B and the other towards C, and the cart moving more or less along the diagonal? Or perhaps envisage two teams competing with each other as in a rugby scrum initially somehow assembled at point A behind the cart and pushing the cart in different directions. These images or comparisons are semi-anthropomorphic in their underlying conception of a 'force' and, perhaps as with 'seeing', our experience of how *we* can exert 'force' is being

given a schematic representation while leaving opaque what the initiating agency of this force is.

Yet if we look back at Newton's text the diagonal line AD would actually seem to represent not so much a conjoined magnitude of 'force' but rather a time or velocity, since it indicates the time taken '*in the same time that it would describe the sides*'. The combined force implicitly reduces the time taken to get from A to D by speeding up the 'movement'. But is this a variation upon Goodwin's criticism of Duchayla's diagram, that the diagram 'depicts as *coincidental* the fact that the parallelogram's diagonal represents the resultant in [not only] *both* direction and magnitude', but also time as well, since on the analogy of walking around or across a field the time taken is related to the speed, or ratio between distance and time, at which the walk is conducted. Einstein's reconfigurations of Newton are again lurking in this simple diagram.

Which takes us back to the second point made earlier, that there is an underlying uncertainty as to what it means to represent a 'line' of 'force' at all. Is Newton's diagram similar to optical diagrams which render schematically 'visible' a 'ray' of light? If we can see a ray of light thanks to those aperture experiments, can we envisage experiments which permit us somehow to 'see' a 'force' and thereby justify drawing it as a 'line'? If not, how can we draw a 'representation' of 'force' through depictions of lines and angles? The subsequent history of tracing particle collisions in cloud chambers and cyclotrons is already implicit here. Undoubtedly, Newton is taking for granted a great deal of previous work in mechanics, concerning the calculable or 'mathematical' relations between force, weight, distance, and time. But is he so justified?

force

We therefore have to ask what Newton means by 'force' in this context. I want here to cite a detailed study, partly in acknowledgement of an old friend. His account is clear but intricate. In his *Newton on Matter and Activity* published in 1978., Ernan McMullin commented on this diagram and the corollary (p. 34):

> At first sight, the 'forces' mentioned here might seem to be forces in the modern sense, and the theorem the familiar one regarding the parallelogram of forces. But this is not the case. Each 'force' is said to cause *uniform* motion; what are compounded, therefore, are two *impulses* at an angle to one another, each of them giving rise to a uniform motion. The starting point of this analysis is still (as it had been in the earlier *De Gravitatione* and *De Motu*) the notion of *impact* ; change of motion is most obviously brought about when one body strikes another. The notion of a continuous force is far less obvious. Because its operation cannot so

easily be tested for or treated mathematically, Newton has to work gradually towards it.

As McMullin points out (p. 33), the very first occurrence of the word 'force' (apart from in the prefatory material) in the *Principia* 'suggests how intractable this problem will be for Newton'. Definition III includes:

> The *vis insita* or innate force of matter is a power of resisting, by which every body, as much as in it lies, continues in its present state, whether it be of rest, or of moving uniformly forward in a straight line. This force is always proportional to the body whose force it is, and differs nothing from the inactivity of mass, but in our manner of conceiving it. A body, from the inert nature of matter, is only with difficulty changed in its state of rest or motion. Upon which account, this *vis insita* may by a most significant name be called the force of inertia [*vis inertiae*]. But a body only exerts this force when another force impressed on it endeavors to change its condition. And the exercise of this force may be considered as both resistance and impulse: *resistance*, insofar as the body opposes the impressed force in order to maintain its present state; *impulse*, insofar as the body endeavors to change the state of another body by not easily giving way to the impressed force of the other.

McMullin comments:

> This passage brings out the tensions inherent in Newton's interrelated concepts of *matter* and *force*. Matter is said to be inert, not in the sense of total passivity but implying, rather, that 'only with difficulty' is its state of rest or motion changed. In this respect, inertia connotes resistance to change of motion, and appears to be associated by Newton with the matter-aspect of bodies specifically. But why is this called 'force' (*vis*), since it 'differs nothing from inactivity'? Of course, it *did* differ from inactivity (as the decision in the final version to use the odd phrase, '*vis inertiae'*, showed). And it also differed from force, at least as force was defined in Law II. Bodies are said to exert an 'impulse', furthermore ; when their own state of motion is affected, they 'endeavor to change the motion' of other bodies. Newton notes the obvious distinction between these two aspects of a body's reaction to impressed force; one he calls 'resistance', the other 'impulse'. But how is all of this to be put together consistently?

In effect, McMullin's overall case is that the relationship between 'matter' and 'force' in Newton is never entirely cogent. He offers a detailed account of Newton's terminology, explicating the several different Latin terms he uses to distinguish 'forces'. I quote only the beginning of McMullin's lengthy analysis of each 'force' (p. 36ff):

(1) *Vis conservans* (VC) is a conserving 'force', the cause (in some sense) of a body's continuing uniform motion. It is measured by the impulse required to bring the body from rest to its present velocity, or equivalently by the body's total momentum. It acts in the direction of motion of the body; it renews the body's motion at successive instants by a sequence of impulses. It is, nevertheless, not a *vis impressa* in the sense of Law II. . .

(2) *Vis resistens* (VR) is a resisting 'force' equal and opposite to the *vis impressa* (VI) that is responsible for its appearance. It is exerted only when a force acts to change the motion of a body; it is not operative when the motion is uniform. . .

(3) *Vis impressa* (VI) is impressed or external motive force in the standard sense of later mechanics. VI and VR appear to be two sides of the same coin, yet one has to be careful in expressing this. If VI and VR have the same sort of reality considered as force, paradox is imminent. For then there will always be equal and opposite forces acting on a body, which would mean that no change of motion would ensue.

Do Newton's different terms refer to different kinds of force, or to different functions of the same force, or to different concepts of different forces? Or is Newton deploying more or less incompatible concepts of a single or general force? After a detailed exposition of Newton's several drafts and unpublished writings McMullin offers this summary (p.79) of the underlying unresolved frameworks, in terms of different explanatory 'models':

As Newton reflected upon the agencies involved in gravitation, four broadly different explanatory models would have suggested themselves to him, each having the warrant of a particular philosophical tradition behind it. Most attractive would be an aether, of course, but it obviously could not be the conventional mechanical one; it would have to be of zero, or almost zero, density and operate on matter in some way other than by pressure. A second, less likely alternative would be to seek in light (as the neo-Platonists had always done) a source for all activity, including even gravitational action. A third possibility, suggested by the alchemical tradition, was a localized 'spirit' or 'active principle', associated with matter in some way, though ultimately distinct from it. Such a principle, not being limited by material modes of causation, could act across spatial gaps; it would be more plausible in explaining short-range forces, perhaps, than in accounting for the long-range forces of gravitation, linking each body with every other. Finally,

one could call upon the power of God directly, as neo-Platonists like More had done; could He not move matter in space just as soul moves body? Thus the 'active principles' would become identical with God's omnipresent power.

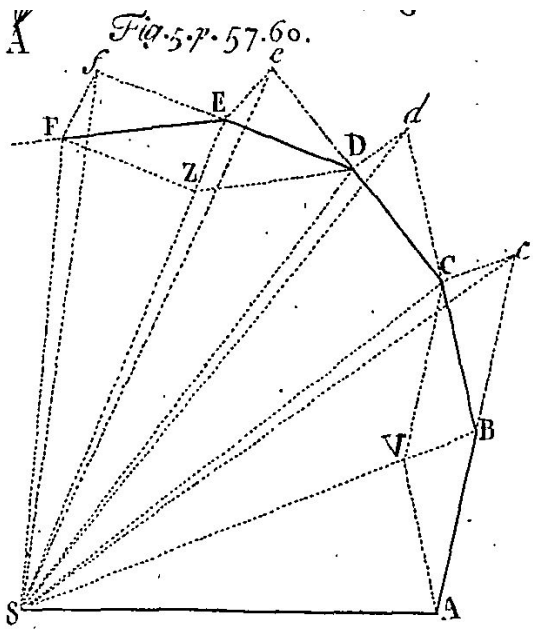
We are partly back with 'occult forces'. So, does it still seem obvious what Newton's simple diagram and Corollary I meant?

> *A body by two forces conjoined will describe the diagonal of a parallelogram, in the same time that it would describe the sides, by those forces apart.*

centripetal forces

With all this in mind, let me consider another of Newton's *Principia* diagrams, from Section II, *Of the Invention of Centripetal Forces,* Proposition I, Theorem I. Newton writes (in Motte's translation):

> The areas, which revolving [orbiting] bodies describe by radii drawn to an immoveable centre of force do lie in the same immoveable planes, and are proportional to the times in which they are described. Pl. 2. Fig. 5.
> For suppose the time to be divided into equal parts, and in the first part of that time, let the body by its innate force describe the right line *AB*.



The solid line ABCDEF can be regarded as indicating segments of an orbit around S, a line of motion and direction. The dotted lines are partly included to
make visible the geometry-based argument involved.

I quote Motte as the version which was the most accessible and influential in England and which has long shaped the understanding of Newton. Which 'vis' term, one might ask, applies to the 'immovable centre of force' or the 'innate force' in this context? Notice that the terminology of 'describe' and 'draw' effectively conflates a 'physical' movement with the action of constructing a diagram on the page. This is partly because in Latin and English the term 'describe' can cover both the construction of a real boundary and a form of inscription. In addition, the English phrase 'drawn to' hovers between an instruction indicating where to 'draw a line' on the page and the notion that the bodies themselves are 'drawn to' (attracted to) the centre of force.

The text continues:

> But when the body [starting at *A*] is arrived at *B*, suppose that a centripetal force acts at once with a great impulse; and, turning aside the body from the right line *Bc*, compels it afterwards to continue its motion along the right line *BC*. Draw *cC* parallel to *BS* meeting *BC* in *C*; and at the end of the second part of the time, the body (by Cor. I of the laws) will be found in *C*, in the same plane with the triangle *ASB* . Joyn *SC*, and, because *SB* and *Cc* are parallel, the triangle *SBC* will be equal to the triangle *SBc*, and therefore also to the triangle SAB. By the like argument, [etc]. . .

One implication of the centripetal force acting 'at once' is that the segments of the line *ABCDEF* can be progressively minimised so that the line becomes a continuous curve (the 'real' orbit) on which the centripetal force operates at every notional point. Some of the dotted lines, which make the geometrical argument visually clear, then appear to act also as traces of possible lines of force drawn on the page from the 'centre' to where those bodies could or would or might have been. In effect, some lines depict 'actual' centripetal force acting on the points at the capitalised letters while others are notional or potential lines of force which *would* have operated at the lowercase letters. There is a difference between the (solid line) track of a moving body whose actual orbital movement could indeed be 'visible', though not as a line actually drawn in the sky, and the other (dotted) lines of motion 'drawn' from the capital letters to the lowercase letters which do not represent any actual movement at all but a possible route which a body might have taken without the countervailing 'innate force' which propels it.

Obviously, I am not trying to settle the entangled issue of quite what Newton intended, but focusing on and probing a continuing ambiguity as to the status of various 'lines' which look much the same on the page but are far from clear if you ask what precisely they represent. A historical line from Pecham's imaginary lines to at least the calculus is being suggested and explored.

Newton's following remarks about 'purely mathematical' propositions might now be compared with Pecham's comment quoted earlier. Book I, Section XI, 'Of the motions of bodies tending to each other with centripetal forces' opens:

> I have hitherto been treating of the attractions of bodies towards an immovable centre; tho' very probably there is no such thing existent in nature. For attractions are made towards bodies; and the actions of the bodies attracted and attracting, are always reciprocal and equal, by law 3 . . . . I shall therefore at present go on to treat of the motions of bodies mutually attracting each other; considering the centripetal forces as attractions; though perhaps in a physical strictness they may more truly be called impulses. But these propositions are to be considered as purely mathematical; and therefore laying aside all physical considerations, I make use of a familiar way of speaking, to make myself the more easily understood by a mathematical reader.

However, as 'mathematical reader' or not, are we to accept that for Newton the 'force' which shapes an orbit can be both conceptually conceived and legitimately drawn as 'lines' between the centres of two or more celestial objects, A and B, like a rope which might be stretched between them, as in the image deployed in the gloss on Law III? And does the 'rope' somehow now have an intrinsic elasticity which pulls ('draws') two (or more) points mutually towards each other? But if there is no other object to exercise a mutual attraction does the 'rope' have nothing to 'pull' on or be drawn to? Like a one-sided tug-of-war? And if there is no B, what is it that stretches from A, and how does it stay there? Moreover, as with a beam of light, this 'force' would surely appear to radiate and therefore comprises an infinite number of 'ropes' or lines, with many untethered, not reaching or tying reciprocally together other objects.

If every body 'attracts' every other body and yet, as Newton insists in an 'Advertisement' on the front page of the second edition of the *Opticks*, that he does 'not take gravity for an essential property of bodies' (of matter), then does gravity nevertheless operate in areas where there are no bodies or particles? In a letter to Bentley in February 1692 Newton wrote concerning this 'absurdity':

> That gravity should be innate, inherent, and essential to matter, so that one body may act upon another at a distance through a vacuum

> without the mediation of anything else, by and through which the action and force may be conveyed from one to another, is to me so great an absurdity that I believe no man who has in philosophical matters a competent faculty of thinking, can ever fall into it.

Eventually, 'gravity' came to be regarded not so much in terms of 'drawing' 'lines of force' but rather as 'explained' by the effect upon objects of the 'curvature' of 'space-time' by and around objects – a notion which has generated its own problems as to how to depict or diagrammatise the curvature of space-time.

*

What has, I hope, emerged from this brief excursus is not only the problematic character of the 'lines' in Newton's diagrams and the difficulty of interpreting them, but also the necessity for close textual investigation of the various editions of the published texts and of the numerous drafts and notes which underlay Newton's thinking. I might here refer to the work of another old friend, Al Shapiro's magnificent edition of Newton's *Opticks*. Meric Casaubon would have admired such critical philological endeavours and felt partly vindicated in denying that only 'experimental' science provided 'useful' learning and knowledge.

But Casaubon would also, had he read it, have been very much concerned with how Newton's work related to the more fundamental objection Meric had raised against the 'experimental philosophy' of the Royal Society, or at least its propagandists, that the new developments in science endangered belief in the reality of an 'invisible' world. For Casaubon our world includes such invisible entities as God and the soul, angels and devils, regarded as 'spiritual' beings radically different from 'material' objects. It was as a crucial prop to his belief in such an invisible world that Casaubon asserted the reality of witches. A distinction between 'matter' and 'spirit' was fundamental to the philosophical position he articulated and arguably to the Christian worldview he inherited. The Council of Nicaea had once in effect equated visible and invisible with corporeal and spiritual. But if Angels might dance on the point of a pin could you draw a line between them?

close-ups

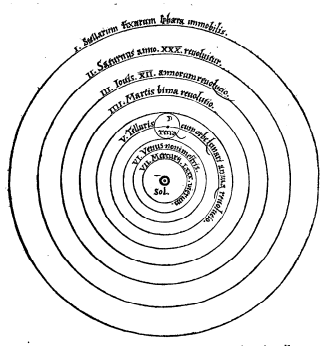
It is ironic that in the same years that Casaubon was writing his 'credulity' volumes Robert Boyle's *Micrographia* appeared, in 1665-67, with its numerous meticulous drawings of what had only recently become visible under the new microscopic apparatus. Arguably, the seventeenth-century revolution in science brought about, above all, a transformation not only in Aristotelian philosophical notions of 'form' and 'matter' but in general perceptions (literally) of 'visibility' and the 'invisible', including concepts of

'occult' and 'hidden' forces, culminating eventually, one might suggest, in our current notions of 'dark matter' and 'dark energy'. If ninety-five percent of the universe is (intrinsically?) 'invisible' to us does it become increasingly problematic to maintain a distinction between 'matter' and 'non-matter', or even for some traditional believers how 'the material' might be distinguished from 'the spiritual'. Recall Pecham's *questiones* about 'matter' and 'not-being'.

Any general or non-expert 'understanding' of scientific theories has considerably depended upon graphic representations of some kind and, in Wittgenstein's sense, often involved not just 'following', say, a geometrical construction or mathematical calculation but of being able to accomplish it for yourself. A diagram where we don't know how or why the lines are to be connected in particular ways, or a diagram without an explanatory gloss, can be frustratingly opaque, though 'use and custom' may familiarise us with drawing and arranging lines even when we don't quite know what they mean.

Equally, as examples from Pecham's manuscripts might show, an explanation without a diagram of what is being explained can be just as frustrating. Even if for Descartes a geometrical construction can always be replaced by algebraic calculations, so that for example a configurations of 'forces' can be given as an algebraic equation, it may be more difficult to go from the algebra back to a coherent geometrical construction. In Kirkby's novels we also have the unconvincing representation of a Cartesian-like autodidact who can teach himself mathematics simply from diagrams, the explanations for which he is unable to read. A close analysis of Newton's texts and diagrams could provide us with further variations.

I have considered Newton at some length and it would be inappropriate to devote a similar attention to subsequent theorists. I might simply reproduce some familiar diagrams or illustrations and very briefly prompt questions about their ambivalence or misleading implications. We might look at diagrams of the solar system before Newton, for example that familiar image from Copernicus revolutionary *De revolutionibus orbium coelestium.*



There are obvious issues here of scale in the different distances between orbits, the radically impossible apparent viewpoint, and the unavoidably static nature of such diagrams on the page. The classical period had sometimes tried to provide fully working physical models, as we know from the attempts to create what has been hyperbolically labelled as the first computer, the Antikythera mechanism (see Alexander Jones, *A Portable Cosmos*, 2017), and our own contemporary computer-aided 3-D graphics still tend to (mis-)represent the solar system at a scale and viewpoint to fit a screen

Faraday and Maxwell

After Newton, one might obviously select for comment the work of Faraday and Maxwell, and here I am in debt to another old friend, Mary B. Hesse and particularly her *Forces and Fields* (1961). Faraday famously had little skill in mathematics and his contribution was primarily in recording his detailed and even obsessive experimentation, for which accounts he characteristically provided not so much diagrams of any 'theory' but rather illustrations of his apparatus.

Yet his 1852 lecture 'On the Lines of Magnetic Force' prompted Maxwell's own work, starting with the 1855-56 essay *On Faraday's Lines of Force*. In the Preface to the 1873 first edition of *A Treatise on Electricity and Magnetism* Maxwell looked back at his starting point:

> Faraday, in his mind's eye, saw lines of force traversing all space, where the mathematician saw centres of force attracting at a distance: Faraday saw a medium, where they saw nothing but distance: Faraday saw the seat of the phenomena in real actions going on in the medium, they were satisfied that they had found it in a power of action at a distance impressed on the electric fluid.

The emphasis on visuality is worth noting. Faraday himself had written in the *Experimental Researches* (III, 1855, p.542):

> The term *line of magnetic force* is intended to express simply the direction of the force in any given place, and not any physical idea or notion of the manner in which the force may be there exerted; as by actions at a distance, or pulsations, or waves or current, or whatnot.

And yet:

> It would be a voluntary and unnecessary abandonment of the most valuable aid, if an experimentalist, who chooses to consider magnetic power as represented by lines of magnetic force, were to deny himself

> the use of iron filings. By their employment he may make many conditions of the power, even in complicated cases, visible to the eye at once. (p. 397)

In the lines generated in iron filings by a magnet Faraday saw almost a physical diagram automatically provided by nature, but without an accompanying explanatory gloss. Nature's lines did not explain themselves.

In *Matter and Motion* (1873) Maxwell has a paragraph (§5) devoted to diagrams, in which he notes:

> We shall use the term Diagram to signify any geometrical figure, whether plane or not, by means of which we study the properties of a material system. Thus, when we speak of the configuration of a system, the image which we form in our minds is that of a diagram, which completely represents the configuration, but which has none of the other properties of the material system.

Indeed, Maxwell's very first publication was concerned with how to draw ovals and one of his last articles was a entry for the *Encyclopaedia Britannica* on the history of diagrams. But notoriously he attempted to provide illustrative models based upon machinery or mechanics, claiming them not so much to represent how electromagnetic forces actually operated but to show that it was possible to envisage how they might operate.

In *A Dynamical Theory of the Electromagnetic Field* he offers a variation on these issues:

> I have on a former occasion attempted to describe a particular kind of motion and a particular kind of strain, so arranged as to account for the phenomena. In the present paper I avoid any hypothesis of this kind; and in using such words as electric momentum and electric elasticity in reference to the known phenomena . . I wish merely to direct the mind of the reader to mechanical phenomena which will assist him in understanding the electrical ones. All such phrases in the present paper are to be considered as illustrative, not as explanatory. In speaking of the Energy of the field, however, I wish to be understood literally.

Yet how is the term 'energy' to be understood 'literally'?

Maxwell does provide some diagrams in relation to the problem posed in *A Treatise* chapter 7, on 'Forms of the Equipotential Surfaces and Lines of Induction in simple cases'. He draws a version of the kind of contour map which shows the gradient or altitude changes in a landscape. Its purpose here is primarily to mitigate the difficulty of actually doing the relevant mathematics.(§ 117):

> We have seen that the determination of the distribution of electricity on the surface of conductors may be made to depend on the solution of Laplace's equation . . It is not in general possible by known mathematical methods to solve this equation so as to fulfil arbitrarily given conditions, but it is easy to write down any number of expressions for the function V which shall satisfy the equation, and to determine in each case the forms of the conducting surfaces, so that the function V shall be the true solution.
>
> . . It appears, therefore, that what we want is a knowledge of the forms of equipotential surfaces and lines of induction in as many different cases as we can collect together and remember. In certain classes of cases, such as those relating to spheres, there are known mathematical methods by which we may proceed. In other cases we cannot afford to despise the humbler method of actually drawing tentative figures on paper, and selecting that which appears least unlike the figure we require.
>
> . . I have therefore drawn several diagrams of systems of equipotential surfaces and lines of induction, so that the student may make himself familiar with the forms of the lines.

The diagrams provided in a series of plates might be regarded as a preliminary graphical modelling of some aspects or components of a 'field', but Maxwell could provide little by way of illustrative diagrams for his other crucial notion, of an 'electromagnetic wave'. Only with the resources of recent computerised animation do we find plausible attempts to visualise electric and magnetic orthogonal wave oscillations actually in motion, but these sometimes appear as simply a version of an oscilloscope display reacting to varying imputs, as on a moving graph. Needless to say, an oscillating 'wave' on a heart-monitoring machine display is not 'travelling' but only changing through time, however graphically animated.

Maxwell's *Treatise*, which explored in detail and with considerable ambivalence the problem of what it is that is being conceptualised, represented, and understood, has frequently been reduced to just four partial differential equations. Given such preference for merely summary mathematical (or one might say mechanical) formulation it might be remembered that Maxwell himself had warily recognised that there is a dubious equation, if that is the appropriate word, between even the mathematical procedures of subtraction and addition and the use of terms such as 'negative' and 'positive' to designate two 'charges' or different modes of 'electrification' (Volume 1, § 27):

> It is the established practice of men of science to call the vitreous electrification positive, and the resinous electrification negative. The exactly opposite properties of the two kinds of electrification justify us in indicating them by opposite signs, but the application of the positive

> sign to one rather than to the other kind must be considered as a matter of arbitrary convention, just as it is a matter of convention in mathematical diagrams to reckon positive distances towards the right hand.

The remark has a wider resonance, including any Cartesian grid organised around zero.

In his 1881 *Elementary Treatise on Electricity* Maxwell envisaged at least a possible diagram, in § 54, 'Lines of Electrical Force' :

> If the direction of the electric force at various points of the field be determined, and if a line be drawn so that its direction at every point of its course coincides with the direction of the electric force at that point, such a line is called a Line of Force. By drawing a number of such lines, the direction of the force at different parts of the field may be indicated.
>
> The lines of force and equipotential surfaces may be drawn, not in the electric field itself, where the mechanical operation of drawing them might produce disturbance, but in a model or plan of the electric field. Drawings of this kind are given in Plates I to VI at the end of the volume.
>
> Since the electric force is everywhere perpendicular to the equipotential surfaces, the lines of force cut these surfaces everywhere at right angles. The lines of force which meet the surface of a conductor are therefore at right angles to it. When they issue from the surface the electrification is positive, and when they enter the surface of the conductor the electrification is negative. A line of force in every part of its course passes from places of higher to places of lower potential.

Again, the accompanying images provided in the Plates raise more questions. There is a Note to §58:

> By an imaginary surface is meant a surface which has no physical existence, but which may be imagined to exist in space without interfering with the physical properties of the substance which occupies that space. . . Imaginary quantities, such as are mentioned in treatises on analytical geometry, have no place in physical science.

We are back to 'imaginary' lines, and Pecham's problem.

In the succinct Preface to *Matter and Motion*, written in 1877 shortly before he died, Maxwell briefly anticipated the paradigm shift which was to be partly prompted by his own work:

> Physical Science, which up to the end of the eighteenth century had been fully occupied in forming a conception of natural phenomena as the result of forces acting between one body and another, has now fairly entered on the next stage of progress – that in which the energy of a material system is conceived as determined by the configuration and motion of that system, and in which the ideas of configuration, motion, and force are generalised to the utmost extent warranted by their physical definitions.

In trying to establish the experimental foundation for Maxwell's electromagnetic waves Heinrich Hertz published several articles collected in 1892 and translated in 1893 as *Electric Waves*, but he provided no images apart from line-drawings of his apparatus and schematic 'circuit diagrams' which are also in effect apparatus models in which the line depicting an electricity-carrying wire simply stands in for whatever electricity is.

By 1930, further fundamental shifts allowed Heisenberg's *Physical Principles of the Quantum Theory* to 'outline' (yes) or make explicit what seemed to be the visual impasse Maxwell had constructed and encountered (my emphasis):

> Just as in the case of particles the limitations of a wave representation were not originally taken into account: so that historically we first encounter attempts to *develop three-dimensional wave theories that could be readily visualised* (Maxwell and de Broglie waves). For these theories the term 'classical wave theories' will be used; they are related to the quantum theory of waves in the same way as classical mechanics to quantum mechanics. . . After a critique of the wave concept has been added to that of the particle concept all contradictions between the two disappear – provided only that due regard is paid to the limits of the applicability of the *two pictures*. (p. 47)

> . . the wave and the corpuscule pictures both possess the same approximate validity. This indeterminatenesss of *the picture of the process* is a direct result of the indeterminateness of the concept 'observation' – it is not possible to decide, other than arbitrarily, what objects are to be considered as *part of the observed system and what as part of the observer's apparatus*. (p. 64)

Discussing the statistical interpretation of quantum theory in relation to the theory of relativity, Heisenberg added (p. 58):

> One becomes entangled in contradiction if one speaks of the probable position of the electron without considering the experiment used to determine it . . the statistical character of the relation depends on the fact that the influence of the measuring device is treated in a different

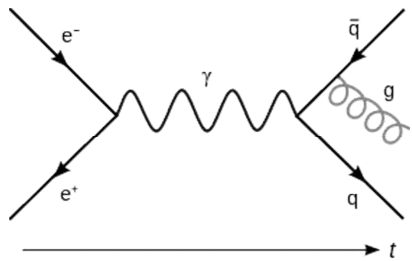
manner than the interaction of the various parts of the system on one another . . For these observations, however, . . *we shall be forced, for example, to include our own eyes as part of the system, and so on.* The chain of cause and effect could be quantitatively verified only if the whole universe were considered as a single system – but then physics has vanished, and only a mathematical scheme remains.

It is indicative of the basic and problematic paradigm shift since Newton that a fairly representative popular book such as *The Six Core Theories of Modern Physics* by Charles F. Stevens (1996) contains not a single diagram or illustration but every page is densely populated with mathematical formulae and equations.

As John Pecham's editor David Lindberg once remarked, the mediaeval approach to the study of optics was to develop a theory of vision, of how a spectator sees, whereas contemporary geometrical optics could almost be conducted without reference to human eyes at all. The same might be said, in an extended sense, of much of the post-Maxwell development of theoretical physics. While Meric Casaubon may have complained that the experimental approach of the Royal Society left little room for the world of the 'invisible', much of twentieth-century physics focused, in its own way, upon not only the invisible but the unvisualisable. And the function of images, lines and diagrams became even more ambivalent. See, for example, Arthur Miller's *Imagery in Scientific Thought* (1986), or *Representation in Scientific Practice*, edited Lynch and Woolgar (1990), and the subsequent *Representation in Scientific Practice Revisited* (2014). Let us however stick to following our lines.

Feynman diagrams

Perhaps the most iconic visual figures in late twentieth-century theoretical physics were known as 'Feynman diagrams'. Again, these were constructions in lines and angles, but now with the innovative addition of wavy lines, though not representing either water or waves. Here is a standard example of a 'Feynman diagram' taken from the relevant Wikipedia entry, together with a brief excerpt from the accompanying text.



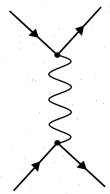
> In this Feynman diagram, an electron and a positron annihilate, producing a photon (represented by the blue sine wave) that becomes a quark–antiquark pair, after which the antiquark radiates a gluon (represented by the green helix).

The comment implies that we are looking at some form of representation of the interaction of two subatomic particles, a schematic diagram allowing us, as if with suitably Superman vision, to see or visualise some such interaction.

Yet other parts of the Wikipedia entry imply something quite different:

> Feynman diagrams are often confused with spacetime diagrams and bubble chamber images because they all describe particle scattering. Feynman diagrams are graphs that represent the trajectories of particles in intermediate stages of a scattering process. Unlike a bubble chamber picture, only the sum of all the Feynman diagrams represent any given particle interaction; particles do not choose a particular diagram each time they interact. The law of summation is in accord with the principle of superposition—every diagram contributes to the total amplitude for the process.

Compare these two comments with another Feynman diagram and its 'interpretation' in a standard text-book:



This configuration of lines and squiggles is provided not as a diagrammatic representation of the visualisable tracks or traces of particles colliding – but as a visual shorthand for the following calculation:

$$(O_1 ie\gamma^{\mu} I_1)\left(\frac{-ig_{\mu\nu}}{p^2}\right)(O_2 ie\gamma^{\nu} I_2)$$

I will not even attempt to unpack this mathematical symbolisation. But clearly we have here very different accounts of what these diagrams are doing. It might seem simplest to ask Feynman himself, or at least to

consult his many publications. However, I cite these Wikipedia entries partly because Feynman's own works, unlike most of those I have discussed so far, remain under copyright, which discourages anything much more than indirect or quasi-quotation. So let me attempt a mere paraphrase or two.

In the lectures published in 1985 as *QED* Feynman outlined (p. 5f) how in the 1920s Maxwell's theory of electricity and magnetism had to be brought into accord with the principles of quantum mechanics, to produce a theory of the interaction of light and matter, known as 'quantum electrodynamics' or QED. But (p. 12f) any reasonable predictions made within the framework of quantum electrodynamics entailed calculating the overall probability of events at the quantum level, which could happen in multiple alternative ways. The calculations therefore involved, in Feynman's words (p. 59), making 'an awful lot of little arrows on a piece of paper', one arrow for each way an event *might* happen, and finally summing the overall probability of the event by 'adding' the arrows to each other, a matter of arranging all the arrows head to tail in a single sequence and drawing a final arrow from the first to the last arrow, with the square of that concluding arrow representing the 'amplitude' or overall probability of the event. As Feynman laconically remarked, 'It takes seven years – four undergraduate and three graduate – to train physics students to do that in a tricky, efficient way.'

Quite what the students are actually doing in drawing 'little arrows' might be clarified by first noting a continuity with Maxwell himself. In *Matter and Motion* §53. 'Addition of Forces', Maxwell explains:

> If any number of forces act simultaneously on a body, each force produces an acceleration proportional to its own magnitude . . Hence if in the diagram of accelerations . . we draw from any origin a line representing in direction and magnitude the acceleration due to one of the forces, and from the end of this line another representing the acceleration due to another force, and so on, drawing lines for each of the forces taken in any order, then the line drawn from the origin to the extremity of the last of the lines will represent the acceleration due to the combined action of all the forces.

Maxwell adds :

> Since in this diagram lines which represent the accelerations are in the same proportion as the forces to which these accelerations are due, we may consider the lines as representing these forces themselves. The diagram, thus understood, may be called a Diagram of Forces, and the line from the origin to the extremity of the series represents the Resultant Force. An important case is that in which the set of lines representing the forces terminate at the origin so as to form a closed

figure. In this case there is no resultant force, and no acceleration. The effects of the forces are exactly balanced, and the case is one of equilibrium. The discussion of cases of equilibrium forms the subject of the science of Statics.

Maxwell's 'lines', in this passage, are in effect vectors denoting both magnitude and direction of force, each variation having to be separately calculated with the net effect attributable to the combined effect of the changes of direction and the increases or decreases of magnitude which cumulatively reinforce or cancel each other out in the overall sequence.

Feynman's procedure can be regarded as a version of this 'addition of forces' diagram, with his lines no longer representing lines of light or lines of force (or even Maxwell's 'a line representing in direction and magnitude the acceleration'), but lines of 'probability', with the overall diagrams constructing a sequence of probabilities, each represented by a 'length' and a 'direction', as oriented on a graph indicating an 'angle' of probability lying between 0 and 1, with for example 45 degrees as a 50-50 probability. However, making the calculations for each possible way in which interactions or collisions between subatomic particles might occur was formidable in itself, let alone keeping track of the cumulative interrelations between numerous probabilities in order to arrive at a net sum of likelihood. The question again arose as to the relationship between model or diagram and 'real' physical processes. An answer involves a brief history. It is time to draw upon the scholars again.

drawing theories apart

David Kaiser's 2005 study *Drawing Theories Apart* tracks the proliferation or 'dispersion' of 'Feynman diagrams', and in so doing clarifies the shape-shifting ambiguities of those diagrams. The next few pages are essentially a review of his book. His account emphasises the overall context of a considerable post-war USA increase in the enrolment of graduate, postgraduate, and postdoctoral students in physics, and in particular the pedagogical difficulties in transforming the teaching of physics from being a relatively restricted and largely face-to-face encounter, not unlike the situation in Cambridge for Maxwell's generation, to a system more like a rapid training program catering for an expanded and often less-prepared intake, with courses increasingly delivered through lectures for large student audiences and the somewhat hectic publication of standard textbooks. In the same post-war years a crisis at the level of theory threatened the achievements of the 1920s and 30s development of both relativity and quantum mechanics.

Experiments at Columbia University in 1947-48, thriftily utilising surplus radio-frequency wartime equipment, produced increasingly more accurate

measurements of energy levels in hydrogen atoms which were irreconcilably at variance with the predictions of Dirac's celebrated equations. One response was to accept that Dirac's calculations could be regarded as only the practically incalculable theoretical scaffolding for experimentally verifiable and more refined results. In particular, attempts to arrive at a figure for the 'bare' electrical charge or the 'mechanical mass' of an electron (Dirac's μ_0) were frustrated by the realisation that an electron could be 'cloaked' by a cloud of virtual electron-positron pairs, spontaneously emitted and unpredictably reabsorbed by a photon, so that any experimental figure arrived at was only of the electron's 'effective mass' (μ_{eff}) – a figure which diverged from Dirac's predicted calculation of μ_0. Moreover, calculating the 'effective mass' was less vulnerable to the unwelcome intrusion of mathematical infinities, but only providing the requisite calculations could be successfully managed.

The procedure, reassuringly labelled 'mass renormalisation', demanded a feat of fiendishly complex mathematics which famously involved Julian Schwinger in several months of intensive calculation. At an invitation-only meeting under the auspices of the National Academy of Sciences in 1948 Schwinger gave a display of mathematical virtuosity to demonstrate his methods for tackling the calculation of electron 'scattering'.

Which is when Feynman diagrams made their first semi-public appearance. Feynman's hurried counter-presentation of an alternative mode of calculation came unconvincingly after Schwinger's acclaimed performance, but instead of providing a systematic introduction to his new diagrammatic approach Feynman offered only a series of worked examples. Without an exposition of the rules which governed Feynman's construction of the chosen diagrams his small but formidable audience raised questions which already indicated quite different interpretations of the possible functions of such diagrams, with Niels Bohr dismissing the applicability of 'space-time' representations and Dirac himself more appositely querying whether Feynman's cascade of probabilities respected the principle of unitarity, that the total of all numerical probabilities incorporated into the procedure necessarily added up to unity. But no explanatory paper was forthcoming from Feynman and his fellow physicists recorded only puzzlement and even bafflement.

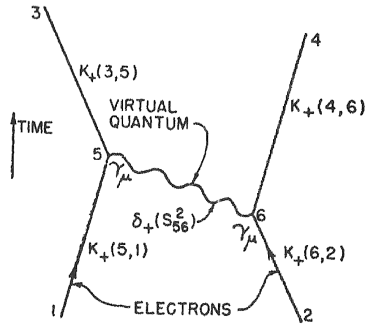
Meanwhile, however, Feynman's English colleague at Cornell University, Freeman Dyson, who had come to the USA after an undergraduate degree in maths at Cambridge, submitted a paper to the *Physical Review* which proposed a reconciliation between the disparate approaches of Schwinger and Feynman and included a lucid exposition of both methods. The paper, published in February 1949, provided the first publicly accessible account of a Feynman diagram, and was quickly followed by a second Dyson paper published in June 1949. By then Dyson was based at the Institute of Advanced Study in Princeton, which under the new and energetic leadership of Oppenheimer was becoming the main cross-fertilising centre

for a new generation of high-flying postdoctoral physicists. From that base, Dyson conducted what David Kaiser presents as almost a proselytising campaign of correspondence, visiting lectures, preprint publications, and personal contacts – yet, as was to become clear, Dyson's understanding of the use of Feynman diagrams was distinctly at variance with Feynman's own.

On the other hand, at Harvard Julian Schwinger in effect outlawed the use of Feynman diagrams by his students, despite some underground resistance. Kaiser quotes one student recalling: 'In the dark recesses of the sub-basement of Lyman Laboratory, where the theoretical students retired to decipher their tablets, and where the ritual taboo on pagan pictures could be safely ignored, students scribbled drawings that disclosed profound identities between diagrams and sums of diagrams.'

Whether at Harvard or elsewhere, however, it seemed difficult for students to master the Feynman procedure without personal contact with others who already claimed the desired competence – which itself could prove unreliable. Kaiser cites (p. 50) the case of Paul Matthews, completing a dissertation at Cambridge in 1950, who circulated to fellow-students a six-page instruction sheet which 'detailed everything from how to draw the various diagrams (which lines should be dashed or wavy; which lines should contain arrows), to where photon lines could and could not be inserted within a given diagram, to which kinds of diagrams contribute to which physical processes, to how – finally – to calculate with the pages and pages of tiny squiggles.'

The first Feynman diagram published (15th September 1949) by Feynman himself was:



Which Kaiser glosses as follows (p. 44):

> The electron on the left had a certain likelihood of moving from the point x_1 to x_5, which Feynman abbreviated $K_+(5,1)$; the other electron similarly has a certain likelihood of moving from the point x_2 to x_6 and hence a factor of $K_+(6, 2)$. This second electron could then emit a

virtual photon at x_6. The photon had a certain likelihood of moving from the point x_6 to x_5 which Feynman labelled $\delta_+(s^2_{56})$. Upon reaching the point x_5, the first electron could absorb the photon. The likelihood that an electron would admit or absorb a virtual photon also had a unique mathematical expression, which could be written as $e\gamma_\mu$, where e was the electron's charge and γ_μ a vector of Dirac matrices. Having given up some of its energy and momentum, the electron on the right would then move from x_6 to x_4, much the way a hunter recoils after firing a rifle. The electron on the left, upon absorbing the photon and hence regaining additional energy and momentum, would scatter from x_5 to x_3. In Feynman's hands, this diagram stood in for a mathematical expression:

$$e^2 \iint d^4x_5 d^4x_6 \, K_+(3,5) \, K_+(4,6) \, \gamma_\mu \delta_+(s^2_{56}) \, \gamma_\mu \, K_+(5,1) \, K_+(6,2)$$

This 'expression' (making allowance for the limits of my available fonts) is essentially a narrative of a sequence of probabilities or a set of calculations, and the diagram is primarily a mnemonic device, 'a reliable way', in Kaiser's words, 'to write down the algebraic form for these long series of integrals without confusing or omitting terms'. In practice, however, such a diagram, which looks like the schematic of a possible physical event, could act as a substitute for actually making the calculations, and be used to provide a rapid way of sketching possible configurations of multiple 'probable' situations. One subtle temptation was to allow such rapidly drawn line diagrams to become doodlings of event-actions with different probabilities – for which the necessary probability calculations could be postponed, or simply assumed to be feasible.

Dyson on the other hand instructed his students to prioritise the rigorous development of the calculations first, with Feynman-type diagrams acting only as supplementary reminders or as a kind of visual check-sum of what needed to be taken into account. 'Feynman diagrams' were a useful flowchart of the requisite calculations to be performed, a reminder of what needed to be included in doing the mathematics, or what Dyson termed a 'book-keeping' exercise. Moreover, Dyson remained committed to a field theoretic approach whereas Feynman had long attempted to think predominantly in terms of particle-particle interaction. Which arguably led to specific temptations for those seduced by his diagrams.

In his September 1949 article 'Space-time approach to quantum electrodynamics' (*Physical Review*, 76) Feynman had stated: 'The theories which have been developed to describe mesons and the interaction of nucleons can be easily expressed in the language used here.' Kaiser cites an article, not by Feynman himself, from 1953 which accordingly claimed: 'The fact that Feynman's notation is given for an electron-photon theory while we are thinking of a nucleon-meson theory only requires that a trivial change be made in the meaning of the symbols.' Yet in 1951 Feynman had already warned Enrico Firmi: 'Don't believe any calculation in meson

theory which uses a Feynman diagram!' – basically because electron-photon interchanges involve only the 'weak' force whereas nucleon-meson binding entailed 'strong' force calculations beyond the parameters manageable within Feynman's calculative procedures.

Nevertheless, as Kaiser remorselessly shows, half the 'Feynman diagrams' published in *Physical Review* between 1949 and 1954 attempted to deal with problems in meson physics. And as Feynman diagrams proliferated through the published literature numerous attempts were made to modify, adapt, redesign, and redraw the suggestive but highly versatile template diagram to accommodate an ever-widening range of alleged applications, despite critical mutterings concerning 'sleight of hand' and 'arbitrariness' from those who remained sceptical of these 'pagan pictures'.

One aspect of the diagrams in particular highlighted the problematic relation between the mathematical, the imaginary, and the 'real' physical process. Derived as they partly were (Kaiser, p.185) from Hermann Minkowski's 'space-time' or 'world-line' diagrams, Feynman diagrams often retained a time axis, but since the emission or absorption of a particle could visually bridge or link the trajectories of two other particles in either direction, this visually implied that event *a* might occur either after or before event *b*. Aristotle would have been intrigued.

We can here return to a claim in the Wikipedia entry:

> Feynman used Ernst Stueckelberg's interpretation of the positron as if it were an electron moving backward in time. Thus, antiparticles are represented as moving backward along the time axis in Feynman diagrams.

But should moving backwards in time be represented only if it is actually possible to move backwards in time? Yet here we have an interpretation of a representation of a mathematical formula, a set of steps in a calculation, a configuration of lines on the page, which thereby in effect assumes a mathematical calculation of negative time to be possible.

In 1949 Feynman was also working on a major paper concerning Dirac's theory of the positron which had essentially postulated that the negatively charged electron was matched by a particle different only in its positive charge. We might again recall Maxwell's cautionary remark about negative and positive. In deploying standard geometrical or graphical coordinates, a 'negative' distance may be simply a distance in an opposite direction, as a 'negative time' can refer to a time interval before a particular event notionally located at a specific point along a 'time-line'.

Even in a world of relativistic time-dilation, a notion of 'negative' time or of particles travelling or events occurring 'backwards' in time raises problems which John Pecham, among many others, would have found puzzling or unintelligible. One might formulate a Scholastic *quaestio*: was there negative time before time began?

The Wikipedia article refers to a further implication of some of Feynman's diagrams which violate another usually accepted element in Einstein's theories:

> In addition to their value as a mathematical tool, Feynman diagrams provide deep physical insight into the nature of particle interactions. Particles interact in every way available; in fact, intermediate virtual particles are allowed to propagate faster than light. The probability of each final state is then obtained by summing over all such possibilities.

So, are 'imaginary particles' allowed to 'propagate faster than light' in a Feynman diagram but perhaps not 'in fact', for example in a cyclotron? Would one be able to design an experiment to find out? Or could it be done simply by drawing arrows or lines on paper?

We could return at this point to Pecham and Newton and specifically to their respective diagrams of light being refracted in water, since Feynman's *QED* opens with his account of variations on that phenomenon (1990, p. 16 ff). In particular, he tries to provide a way of calculating the percentage of photons likely to be refracted by and reflected from both the surface and the interior 'layers' of substances, utilising the lines of probability which could figure in a set of Feynman diagrams. Since the results in effect cycle through a repeat sequence, he invites us to envisage an 'imaginary clock' the position of whose revolving hands indicate the appropriately changing 'angle' of probability.

Unfortunately, my imagined digital wristwatch has no revolving hands. However, I was pleased to find that what was published and publicised as *Feynman's Lost Lecture* proved to be a characteristically lively commentary upon that very same figure 6 in the *Principia* discussed earlier.

In the wake of all this, you might return to Meric Casaubon and consider the difficulty of disentangling the relations between appropriate credulity and inappropriate incredulity. Incidentally, I recall that in Cambridge (UK) in the 1960s it was often whispered that Dirac's favoured research procedure was to assemble a sufficiently pleasing equation and only then find a suitable application for it.

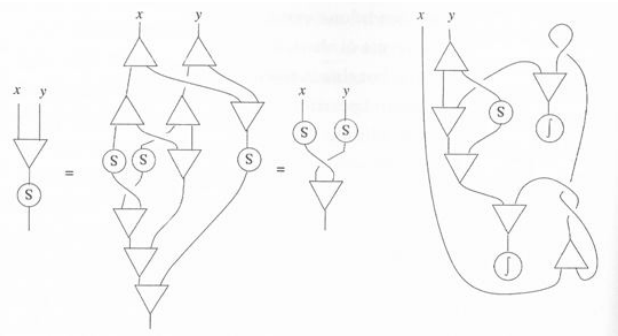
end of the line

The claims in the Wikipedia entries on Feynman diagrams concerning the relationship between a 'mathematical tool' and 'deep physical insight' take us back to Pecham's preface, quoted earlier, concerning the combination of mathematical and 'natural' or 'physical' components in his treatise and his diagrams. The Wikipedia entries themselves highlight the problems of popularising mathematics and science which were raised by Kirkby's work, while the more general issues prompted by Casaubon concerning degrees of belief and the role played by 'use and custom' in our 'credulity and

incredulity' can clearly apply in relation to 'science' as well as to 'religion'. Student physicists might for example, it can seem to an outsider, devote seven years to arranging 'little arrows' without a general agreement or comprehension of their 'real world' significance.

Meanwhile, those of us without such training, or educated outside the requisite mathematical disciplines, can only trust in a hierarchy of 'credulity and incredulity', or the credible and incredible, based eventually on peer-review procedures we have to rely upon in reputable publications. And also, perhaps more than ever, on the public status and reputations of celebrity scientists who publish accessible paperbacks. It is often difficult on that basis to make sense of various current developments. Some almost random examples can cursorily demonstrate the difficulties for ordinary laypersons such as myself.

Shahn Majid's postulation of 'quantum space time' rejects 'the very idea of point particles' as a 'physically meaningless' concept, and appeals to a 'geometry without points', utilising notions from 'braided algebra' in which 'we need never' assign actual numbers but 'just work with the variables as abstract symbols'. This would 'free us from the need to have a picture in the first place', if only because, as he somewhat unexpectedly asks, 'has anyone ever seen an exactly *point* particle, I mean one of truly infinitesimal size?' His preferred algebra 'does not have any points and goes beyond any geometry that you can ever *see*' (his emphasis). Majid provides his own post-Feynman diagrams and glosses, suggesting their possibly multiple – or ambiguous – functions (*On Space and Time*, Alain Connes, *et. al.* CUP 2008, esp. pp. 71-79):



The accompanying caption reads:

> On the right is a computation involving trace, two Fourier transforms, $\partial/\partial x$ and conjugation by y. As well as of relevance to quantum gravity, these could be circuits of an actual quantum computer in the twenty-second century. Unlike a usual computer, when one wire jumps over another there is a nontrivial (braiding) operation

I have no idea how to assess these diagrams, or even interpret them, though I suspect they may have been offered in hope to have a versatility of use comparable to Feynman's.

Another example: a team led by Ekaterina Moreva have attempted to construct experiments which show that 'time' is an 'emergent phenomenon' but only as observed from within the space-time universe, whereas an 'external observer' would concur with the Wheeler-DeWitt equation, which claimed to reconcile relativity and quantum theory – but only at the expense of somewhat paradoxically demonstrating that the passage of time performs no theoretically necessary function, so that in effect nothing ever happens in the universe of the Wheeler-DeWitt formula. By adapting work by Don Page and William Wootters, which claimed that quantum 'entanglement' might be used to measure 'time', the Moreva team's computer-generated 'toy universe' theoretically confirmed that time may indeed be an emergent phenomenon only for 'internal' observers but absent for any observer 'wholly external' to and not interacting with that universe. Mediaeval philosophers and theologians with their concept of an a-temporal omniscient deity might have been intrigued. So might Werner Heisenberg. But Pecham might at least have raised 'questions' concerning how a 'wholly external' 'observer' can even exist to occupy a point of view upon a universe which was wholly designed and constructed in the first place by the experimenters themselves [*arxiv.org/abs/1310.4691*].

Meanwhile, Nima Arkani-Hamed has postulated that a complex geometric object, 'the amplituhedron' can enable radically reduced calculations of particle interactions. Two gluons colliding may produce four reduced-energy gluons billions of times a second in the Hadron Collider, necessitating at least 220 Feynman diagrams to calculate the resultant scattering 'amplitude'. Work by mathematician Stephen Parke and Tomasz Taylor has apparently simplified the 2-gluon amplitude calculation to a single function. Further work deploying 'BCFW' recursion relations allowed such particle interactions to be presented in terms of 'twistor' diagrams, which can now be replaced, according to Arkani-Hamed, by computing the volume of a corresponding 'amplituhedron', which yields an equivalent one-term expression. Kepler, with his attempts to arrange the five Platonic solids to explain and indeed support planetary orbits might have been envious of this extraordinary geometric object, whatever it is..

In addition, the use of the 'amplituhedron' to calculate particle interactions allegedly dispenses with the requirements of locality and unitarity. Locality stipulates that particles can interact only from adjoining positions in space and time while unitarity demands that the probabilities of all possible outcomes of a quantum interaction must add up to 1 (recall Dirac's query to Feynman). Since the amplituhedron is not built out of space-time and probabilities, any such properties only 'emerge' as consequences of the geometry itself, while the received model of space and

time with particles moving in space-time, is a bye-construct of the amplituhedron. 'In a sense, we would see that change arises from the structure of the object,' Arkani-Hamed claims, 'but it's not from the object changing. The object is basically timeless.'

Even more ambitiously, though locality and unitarity were central requirements of quantum field theory, both seem inapplicable in certain calculations involving gravity, which reportedly suggested to Arkani-Hamed and collaborators that there might be a related amplituhedron-like geometric object which would enable a quantum theory of gravity. If the properties of the amplituhedron 'explain' why particles appear to exist, and why they appear to move in three dimensions of space and to change over time, then by removing space and time as fundamental constituents of nature Arkani-Hamed may also be able, on some accounts, to show that the Big Bang and the cosmological evolution of the universe arose out of pure geometry. Pecham might have been pleased. Plato himself might have been impressed. But Hume probably not.

[See http://arxiv.org/pdf/1312.2007.pdf, & http://arxiv.org/abs/1212.5605.]

It's time to move on, or back, if time and movement are still permitted.

picturings

In their somewhat more accessible modes, Pecham and Newton could try to combine in their diagrams both visual representation and a geometrical form of mathematical 'demonstration'. But Maxwell arguably had to recognise an increasingly unavoidable bifurcation between attempts to 'picture' electro-magnetism, at least in any visualisation using mechanical models, and the core deployment of partial differential equations, a mathematical realm rather resistant to diagrammatisation, visualisation, or indeed the use of lines. Feynman's later attempts to combine mathematical tools and physical representation remained problematic and perhaps intrinsically ambiguous.

What may be an attempted paradigm shift in recent theoretical physics seems to be exploring even more complex mathematics and perhaps reviving quasi-geometrical approaches, but without points, space, or time. In this long development, mediaeval and classical demarcations between real and imaginary, and even material and non-material, have been undermined or challenged by issues not only about representation but the very possibility of representability.

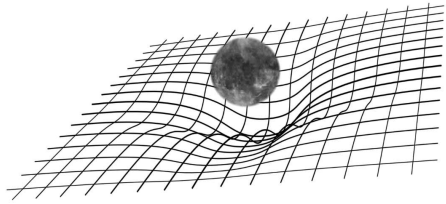
Yet what is now quite striking is the partial displacement of 'diagrams' by (heavily manipulated) photographs, offering us images of the largest features of the universe, the most distant phenomena, and also almost the most infinitesimal. Anybody with an internet connection can now download stunning pictures from NASA and from CERN, but such images

are not self-explanatory, any more than an astronaut's memorable 'Earth-rise' photo of the blue planet hanging in blank space is an explanation of how it can do so.

Yet at the same time, the mathematical tools which are adopted to justify current theories can defy lay comprehension not simply because of the difficulty of the mathematics itself but because what is to be comprehended defies the very capacity to visualise and imagine what the mathematics suggests, which has usually been a component in popular acceptance of previous modes of scientific exploration and explanation. Having a photograph of an 'atom' is now almost a distraction rather than a contribution to comprehension.

Beyond line-drawing diagrams and digitally enhanced photography we increasingly have the pervasive combination of mathematically-derived constructions in 'computer space' with elaborately texture-mapped photo-realistic visuals and animations. However, older issues of intelligibility, of imaginability, and of misleading images, remain.

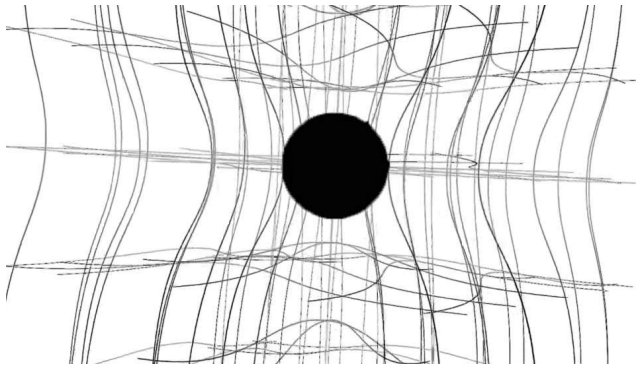
We can instance one familiar image derived from Einstein's relativity theory, often called the 'trampoline', as an attempt to pictorialise a localised space-time curvation, a bending of space and time by the proximate mass of the Earth, on the visual analogy of a material body resting or bouncing upon some form of elastic support or base.



What we are presented with is essentially a two-dimensional flat plain crossed by two sets of curved lines. How do these bending lines relate to space and time? Are they to represent some form of cross-section or pattern of intersections between 'lines' of space and perhaps 'lines of time'? Or do these distorted rectangles somehow 'enclose' space-time? Do the lines not 'represent' anything 'physical' but make 'visible' a 'field' of projected or imagined curves around the Earth, like Maxwell's equipotential contour map? Perhaps most interestingly, the curved distortion is pictured here only in the immediate vicinity of the 'ball' which represents the Earth, but how are we to interpret or explain the implied initial flatness 'elsewhere' which this representation assumes? Even if this 'curvature' of space-time is in some respects a more plausible image of what Newton saw as the effects of a 'force', we still need to be convinced as to how the ball hangs 'above' the trampoline in the first place.

These questions are only intensified if we consider a slightly more sophisticated attempt to visualise the curvature of space-time which at least

makes an effort to represent that curvature as located not only on a single level plane but as encompassing the Earth ball from every angle and every direction.



The curves are here imagined as completely surrounding the Earth and there is no flat trampoline upon which it bounces or rests. The printed static diagram could be given a fully computerised animation treatment. But would it help?

As a final example of familiar but problematic images, consider the attempts to represent the 'big bang'. One animated visualisation, familiar in television documentaries, SF films, and interactive graphics, shows a kind of extended point-of-view-shot zooming into and through a storm of stars rushing towards and past the viewing position, normally utilising a fairly standard renaissance perspective mode of the 'territory' into which the zooming camera proceeds.

Again, issues of viewpoint and location are intertwined. As with the 'extromission' representation of a line of sight as emanating from the eye when a telescope is pointed along a trajectory or Superman glares at the villain, this way of picturing a zoom 'towards' the big bang implies not only the eye or camera taking a journey to a remote distance but also as travelling 'back' in time to some specific distant point. Though the light now reaching us has indeed travelled not only many billions of miles but also billions of years, it is the light which has done the travelling, not some visual ray apparently travelling 'backward' at near light-speed from our current position. Nor is it at all clear whether there is supposed to be some definite location of the 'big bang' to which we might orient ourselves to travel 'towards', as if a primal explosion had occurred at a definitive set of coordinates at which we can point a telescope.

Moreover, claims that the whole universe was, after a few micro-seconds or 'the first three minutes', only the size of an acorn, a grain of sand, or simply a point particle, imply that such an infinitesimal universe was somehow surrounded by and located within some spatio-temporal environment 'larger' than the dimensions of space and time which were,

and are, supposedly the very fabric constructed by the big bang itself. There was no observation viewing platform – or anything else – 'outside' that micro-point from or into which the universe was to 'expand'. Again, it is precisely the effort to pictorialise or imagine some moment of an absolute initial that defeats us but also indicates a genuine conceptual problem.

Even to utilise the notion of a line of sight, a straight zoom, raises major issues which lurk in the very concept of a line. A line might be defined as the shortest distance between two points (or, preferably, 'a straight line is a line which lies evenly with the points on itself') but it can also be envisaged as having no end points at all and as potentially extended to infinity in either 'direction'. So if 'time' is envisaged also as a straight line, could there be an infinite time-line? Aristotle argued that there could be no actually infinite physical straight line, since though a further segment of a line could always in principle be continuously added this was also a process without an end, such that an infinite line could never actually exist all 'at the same time' – and if time was envisaged as an un-ending line, that line could never exist 'all at the same time' (ἅμα). One temptation is to think of a 'curved' line as resulting in a circle, a familiar image of endlessness. The dominant scholastic notion of eternity, as applied to the divine, was precisely that of *tota simul* – 'all at the same time' – but in the sense of time-less-ness, of there being no time, no beginning, no end.

Kilwardby

We could at this point turn, very briefly, to another mediaeval Archbishop of Canterbury, Robert Kilwardby, Pecham's immediate predecessor, a Dominican Friar and a formidable commentator on Aristotle. In his treatise, *De spiritu phantastico*, given the title 'On Imagination' by one modern editor, Alexander Brodie, Kilwardby probed what is involved in 'understanding' and in particular how that process can involve images. The treatise distinguishes between the operation of the senses, the role of *phantasmata*, and the function of intellect or 'cognitive power', including the issue of how far the senses directly provide the images, or the 'spirit' actively seeks to grasp those images, almost a variation upon the debates concerning extromission or intromission theories of eyesight. Kilwardby argues (Question 26):

> There are two kinds of intelligible thing. One is infused or impressed from above. The other is acquired by means of a corporeal or spiritual vision. As regards an intelligible thing of the first kind, it is true that it reaches the intellectual soul without any other vision mediating, since that kind is elevated far above the senses.

Kilwardby here favours a basically Augustinian rather than Aristotelian position: that an act of 'understanding' could involve God's own act of understanding as somehow illuminated into our 'mind', and that God has an 'idea' in his own 'mind' of what he is going to create 'before' he does so, and that idea proceeds into, and is somehow to be found within, the actual creation which results. Kilwardby continues:

> As regards the second kind, this is not so. For that consists of sensible things, and hence such things reach the intellect by means of a corporeal and imaginative vision, and by no other means in nature. And it is this sort of intelligible thing, and the way to grasp it intellectually, that Aristotle seems to be dealing with in *De Anima*. For he says there: 'The mind does not think at all without an image' [*De An*., iii, 7 (431a 16)], and shortly thereafter: 'That which understands thinks the *species* in images.' [431b l-2].

We will come back to Aristotle's *De anima* in discussing Anselm.

In so far as Kilwardby's model involves a visual 'species' penetrating beyond the eye itself into the mind or the generation of some kind of 'internal' image this might suggest the notion of an internal 'eye', as if inside the brain or skull there was a reduced version of another 'I' or eye, somehow watching images on the inside of the retina or as otherwise 'visible' from within the inner mental apparatus. This is the 'common sense' model, once familiar from Cartesian picturings of a kind of inner 'homunculus', which can arise if we try to imagine what intellectual 'imaging' itself is 'like', or attempt to picture what we would see if we could 'see' the internal processes of seeing, an infinite regress of imaging an image of imaging. Pecham sensibly refrained from entering that territory.

Between these two positions, Augustinian and Aristotelian, spiritual illumination and sense experience, divine and human understanding, there is as frequently in medieval philosophy a third domain, that of intelligent entities which are neither divine nor human, those beings which were called 'angels' and whose regular appearance in the biblical texts made it impossible for them to be excluded from philosophical investigations but whose mode of existence posed problems not only about themselves but concerning such basic concepts as space, time, movement, and understanding.

The realm 'angels' occupy was conceived to be in various respects intermediate between the godhead itself and the composite of spirit and body which constituted the human. How for example in this context of epistemological inquiry did the non-corporeal angel acquire knowledge or understanding? In what sense, literally, could they 'see' anything, including images? What was their relationship to that other non-corporeal domain, of geometrical forms, mathematics, numbers?

After all, such quasi-geometrical diagrams as those in Pecham's work might be considered as themselves 'intermediate' images, operating as it were midway between the senses and the intellect. And despite being ontologically pure spirit and therefore invisible, could not angels, as attested by the Bible, themselves become images apparent to us as divine messengers. In the *Summa Theologiae* Aquinas devoted, with his usual persistence and lucidity, fifteen extraordinary *quaestiones* (Pt I, QQ. 50-64) specifically to such matters as whether an angel's actual understanding is identical with its existence or substance, whether an angel's mind is sometimes in an act of knowing and sometimes not, whether an angel knows by discursive thinking, can understand several things at once, can fall into error, and so on. We will later consider Aquinas on angels in connection with the monastic choir and notions of a 'chorus angelorum'.

By comparison with Aquinas, Kilwardby's exploration of angelic understanding is cursory. But their accepted awareness of this 'intermediate' mode of intellectual existence means that their questions can now often seem unexpectedly applicable to any consistent thinking about those entities we are beginning to call artificial intelligences or AIs, about which some of the same 'questions' might be considered.

As usual, thinking about angels was in part a way of clarifying basic concepts, distinguishing what could be said about 'God' and about humans by demarcating what might be said about entities which are neither human nor divine. Recent legal and ethical debates about the status, and indeed rights and responsibilities, of 'artificial intelligences' would not have much surprised mediaeval philosophers. Though Aquinas, despite considering the sense in which angels might 'love' each other, did not have to assess the significance of evolutionary algorithms which enable the self-propagation and gradual self-improvement of material robots and electronic neural nets.

Some questions about angels and their relation to 'space' or position and what we call 'mass' can also be seen almost as versions of conceptual issues which were once posed around sub-atomic particles, quarks, photons, electrons. Can two or more identical electrons occupy the same 'position' or 'orbit', without violating the Pauli exclusion principle – can a multiplicity of angels occupy a point, or pin? If an electron performs a 'quantum leap' to 'occupy' a different 'orbit' or distance from the nucleus of an atom 'where' is 'it' during that transformation – and does an angel which 'moves' do so instantaneously or through intermediate steps? What is even meant by 'orbit' or 'distance' if an electron is not a point particle anyway – is that a category error like asking 'where on earth' I can find an angel? If a photon is directed towards a double-slit barrier does it follow an infinity of trajectories or none at all - and while an angel could not 'be everywhere' at once, like God, it could at least 'appear' or operate simultaneously in several places. Though an angel has no parts or even mass ('measurable quantity', *dimensivae quantitatis*) it can exercise a 'power-quantity' (*quantitas virtualis*), and does this involve 'action at a distance' or some form of virtual contiguity or

location? Perhaps quantum 'entanglement' entails a simultaneous or instantaneous interaction conceptually akin to non-dimensional angelic motion. What distinguishes one electron from any other if each electron is identical, rather as each individual angel despite being non-material is a unique species of its own. And so on.

Even curiouser, as Alice might have said, how do angels relate to temporality? Kilwardby wrote an entire treatise on time, *De tempore,* in which angels feature. He again negotiates a position between Augustine (the influential passage on time in the *Confessions*) and Aristotle (*Physics*, 218a ff.), or between meta-physics and physics. The standard contrasts between 'eternity' and 'time' are supplemented or mediated by a third term, the mode of angelic '*aevium*' – sometimes translated as 'everlastingness' or 'aeviternity'. This allows, or insists, that the 'now' of an angel is not the unchanging 'now' of God or the passing 'now' of human existence, or indeed the 'now' of any other angel. But how, if at all, does one 'measure' aeviternity (one thinks of George Herbert's lovely phrase 'angels age')? Is there even 'earlier' or 'later' in aeviternity? Can aeviternity ever end? Is aeviternity prior to or co-eval with our form of physical time, and could there be an interaction between them, even an angelic intervention into human time (the Annunciation, for example)?

These issues could be seen almost as pre-versions of Einstein's difficulties with how (probabilistic) 'events' at the 'level' of quantum mechanics can interact with, be transposed to, or somehow underpin or interact with, the (deterministic) level of 'ordinary' physics governed by relativity or even Newtonian theory. Asking how these 'levels' can possibly interact is a version of inquiring into the compatibility of relativity and quantum theory. Again, does each angel exist in a different aeviternity from every other, as each human exists, and certainly travels, in our own time if (according to Einstein) our time 'passes' more 'slowly' or 'quickly' depending upon whether we are on top of a mountain or beneath the sea, flying in a supersonic aircraft or a space capsule, as we age differentially depending upon our speed and relation to 'gravity'?

Richard Feynman remarked on at least two occasions that the notion of angels pushing the planets round their orbits was not such a bad idea after all:

> The next question was – what makes planets go around the sun? At the time of Kepler some people answered this problem by saying that there were angels behind them beating their wings and pushing the planets around an orbit. As you will see, the answer is not very far from the truth. The only difference is that the angels sit in a different direction and their wings push inwards. (*The Character of Physical Law,* 1965, 1992 edition, p 18)

> While Kepler was discovering these laws, Galileo was studying the laws of motion. The problem was, what makes the planets go around? (In those days, one of the theories proposed was that the planets went around because behind them were invisible angels, beating their wings and driving the planets forward. You will see that this theory is now modified! It turns out that in order to keep the planets going around, the invisible angels must fly in a different direction and they have no wings. Otherwise, it is a somewhat similar theory!) (*Lectures on Physics* ch. 7–3, Development of dynamics).

He immediately adds, in relation to the 'principle of inertia':

> if something is moving, with nothing touching it and completely undisturbed, it will go on forever, coasting at a uniform speed in a straight line. (*Why* does it keep on coasting? We do not know, but that is the way it is.)

continuities

We are back to John Pecham's 'questions' about creation, which we saw are not primarily concerned with what happened and when, but rather what sense we can make of the very concepts of time, of beginning, of ending, and of our own time as contingent and dependent.

In suggesting some comparisons or partial parallels with more contemporary puzzles I am emphatically not suggesting that Pecham, Kilwardby, or Aquinas somehow anticipated the problems of relativity or quantum theory. Nor even that one somehow led to the other. But rather that the ways in which mediaeval philosophers explored the problems of time are sometimes more or less as unintelligible as those posed by relativity theory or quantum mechanics – but also, and perhaps more strikingly, that they are often almost as intelligible. If we find it difficult to follow Kilwardby's philosophical arguments about different kinds of 'now' or three modes of temporality, we might also find the mathematical arguments difficult to follow in an Einstein or Dirac text. Above all perhaps, it is not clear what it would mean to 'understand' either kind of 'solution'.

In his commentary on Lombard's *Sentences* (*Quaestio xiii* : *quid sit evum?*) Kilwardby remarks:

> To someone who objects that it seems absurd that everlastingness should essentially measure duration, since it would thereby be measuring itself, it should be said that it is not absurd. For it is universally the case as regards simple things that they give their name to, and measure, themselves. For example, motion is measured by time, but time is measured by itself.

There may be some elements of our world which are in a sense the bedrock of what we can grasp, and we may sometimes have to deploy concepts which cannot be further analysed, defining the very boundaries of intelligibility. Feynman again: 'We do not know, but that is the way it is'it. Still.

Cardinal Barberini's argument in the scene from Bertolt Brecht's *Galileo* quoted earlier appeals to 'God' as the maker of both cosmos and brain, universe and mind. And implies that perhaps the evolution of the human brain has not necessarily developed a capacity for conceptual coherence, or indeed wholly consistent reasoning, systematic logic, inference and induction, except inso far as such capacities were required for survival. A god might have made us with brains or minds that could understand, and admire, its cosmic handiwork, but there is no reason, in any sense, why evolution should have done so.

Evolution has perhaps equipped most of us to manipulate basic counting, measurement, and units, so as to try pragmatically to master our environment, but incrementally to evolve or somewhat haphazardly to construct advanced mathematics may have entailed no guarantee that we can ever fully 'understand' the mathematics we have evolved. Though perhaps future angelic-like artificial intelligences may help invent more adequate evolutionary algorithms.

taking a line for a walk

There is one use of a 'line' which still intrigues me. When we try to make connections between several questions, different propositions, or disparate areas of inquiry, there is frequently an 'intermediate' stage in the process of 'understanding' when we re-arrange a preliminary listing of scribbled issues or shorthand notes on a scrappy piece of paper before us, so as to form them into clusters, and then further re-arrange those groupings into various different sequences, eventually aiming for a revised linear organisation, not least because most audience-oriented writings today, especially academic texts and lectures, are predominantly linear operations, unfolding in time or as an ordered sequence.

At some stage, we often resort to drawing a kind of provisional diagram, perhaps of circles or arbitrary shapes around linked notes or questions on the page, which are then further connected by roughly drawn lines and arrows between those circles, even when we are not quite sure what those lines now indicate – except that we have at least momentarily grasped some connection. Each line might indeed stand in for a different kind of connection from any other lines. We might, like Chinese calligraphers, reach for differently coloured pens for different kinds of glimpsed connection, different 'lines of thought'.

This process of jotting down scribbled lines, and then not being sure what the elusive connection was, may happen because it is sometimes

impossible to 'hold' an entire complex explanation, or even a whole lecture, in the brain's neural net *tota simul*, or to use Aristotle's term ἅμα, 'at once'. There is a certain comparison with composing a multi-branching digital hyper-text, or pursuing inter-linked web-connections while able to access or consult only a limited number of 'windows' open at any one moment. One of the memorable aspects of Thomas Aquinas was that he could allegedly dictate three or four texts on different subjects 'at the same time' to different stenographers, whereas most of us find it difficult to keep 'in mind' the connections even between separate *quaestiones*.

There are I suppose two different temperaments in constructing an argument or an exploration. One is to attempt to follow a straight line, to go straight to the point, assuming one can find or construct one. Another is summed up in the phrase 'taking a line for a walk', adapted from the opening of Paul Klee's 1925 *Pedagogical Sketchbook*: 'An active line on a walk, moving freely, without goal. A walk for a walk's sake. The mobility agent is a point, shifting its position forward'. Characteristically, Klee's admirer Walter Benjamin once sketched a diagram of his entire life, sitting at a café table, only to see it promptly blown away by a gust of wind. He also remarked that he wanted to construct a book entirely composed of quotations. Earlier, I quoted Meric Casaubon concerning his gout-induced difficulty in finding quotations.

I can now add another quotation from Richard Feynman:

> We see in the newspaper, every once in a while, pictures of a great cathedral made with little matchsticks . . by some retired fellow who keeps glueing matchsticks together. . . If we imagine that this wooden cathedral were actually built on the scale of the real cathedral, we see where the trouble is; it would not last – the whole thing would collapse because of the fact that scaled-up matchsticks are just not strong enough. (*Six Not So Easy Pieces,* ch. 2-2, Symmetry in space and time.)

This essay/book clearly deploys not only quotations as matchsticks but a wandering or meandering line. I am not claiming that there is a direct line of influence from Pecham to Feynman, or even from Pecham through Barrow to Newton. I have been 'drawing' or following some lines from Pecham to a variety of topics and ignoring other lines which I could have pursued, just as I am soon going to stroll from Pecham to, perhaps, the 'miracle' windows, or go through the door near his tomb into the cloister. I can wander from Pecham's effigy to a variety of locations, observing only the constraint of considering thoughts prompted by the cathedral itself, but I can also construct a kind of non-linear set of connections – this book is as much hypertext as linear.

However, let me close this ambling consideration of Pecham's geometrical optics with a not quite serendipitous set of connections. Twenty-five years ago, an extraordinary palimpsest manuscript now known as the 'Archimedes Codex' was at last partially deciphered. The original manuscript had been over-written by a liturgical text in 1229, rendering the original mathematical treatises almost completely illegible.

The only two other known mediaeval manuscript versions of Archimedes' writings had disappeared from the public record in the Renaissance and the last time we know that one manuscript was used as a source for understanding and indeed translating Archimedes was at Viterbo in the 1270s, when William of Moerbecke had consulted it for his translations of Archimedes. Recall that his colleagues at Viterbo included John Pecham and Vitelo.

The genuinely exciting tale of how the palimpsest was subjected to modern scientific analysis has been told in a compelling book *The Archimedes Codex* by Reviel Netz and William Noel. It is now clear that the Codex includes not only an otherwise unrecorded Archimedes treatise known as *The Method* and that Archimedes had anticipated some much later developments in mathematics than had been previously realised. From 1999 the most advanced optical engineering apparatus and digital software was used to penetrate the layers of the palimpsest. The team was managed by a scholar whose specific scholarly domain had previously been a late mediaeval manuscripts derived from the Canterbury Christ Church scriptorium. His study on *The Harley Psalter* (1995) had shown the complex connection with the *Canterbury Psalter*, a manuscript which will figure in this essay several times.

The book by Netz and Noel ends with a somewhat over-confident eulogy to modern scientific and mathematical expertise which might have irked Meric Casaubon. But it is a pleasing thought that one of the many tributaries to the development, however indirectly, of the optical equipment deployed was John Pecham, thirteenth-century Archbishop of Canterbury. The *Archimedes Codex* manuscript, it seemed at first, perhaps also included copies of a treatise on light, a commentary on Aristotle, an argument concerning the creation of the world out of nothing. Some of these suggestions proved premature.

But as it happens, the minimal geometrical diagram which is recorded as the epitaph on the lost gravestone of Archimedes is almost identical with the image drawn on the opening page of the fabulously illustrated 1483 *Nuremberg Chronicle* which is used to indicate creation from nothing: a circle inscribed within a square. There is a battered copy of the *Chronicle* in the Cathedral library.

*

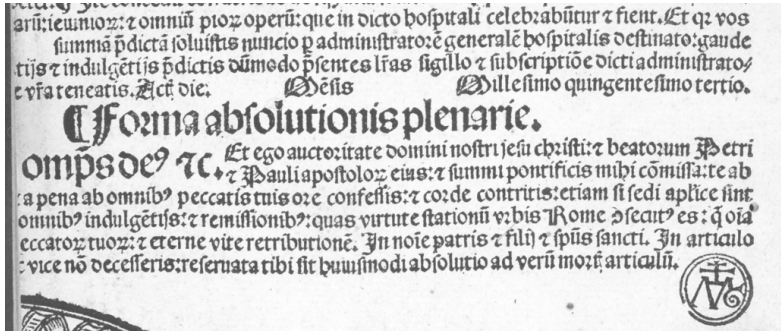
This segment of my stroll has considered some relations between philosophy and science rather more than any 'conflict' between science and belief, while perhaps being biased towards a primarily propositional notion of what it is that people 'believe', rather than a view of religion as a matter of 'custom and use'. I will eventually reach Saint Anselm's chapel and offer some considerations on the relationship between theology and religious belief. Before that, however, there is another area in which some of the issues concerning mathematics, credulity, and over-confident claims by a particular discipline, emerge again. Meric Casaubon once gave an account of credulous American Indians exchanging colonial glass beads for native gold and silver.

I intend next to think about what used to be the cathedral Treasury and the peculiar role of economics in relation to this once-monastic cathedral. Recall that John Kirkby regarded the distribution of ecclesiastical revenues as violating Christian principles and, not incidentally, that Newton is credited with providing tables for the calculation of cathedral revenue: the connections between monks and money are worth considering.

The two archiepiscopal friars, the Dominican Kilwardby and Pecham the Franciscan, considerably disagreed over the issue of ecclesiastical poverty and the wealth of the church. This was not simply because, like many mediaeval intellectuals, they took an interest in a wide range of issues. Perhaps the only recent Archbishop of Canterbury with a comparable scope was Rowan Williams.

However, the main reason for including a consideration of economics in this overall response to Canterbury Cathedral is not just its enormous wealth in previous periods but also because the basis for that wealth raises questions which challenge contemporary notion of economics. Admittedly, the connection may be as distant, or as close, as that between Pecham's optics and those tourists taking photographs this morning in the nave.

*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ꝛ vsq teneatis. Act die. Mēsis Mille simo quingentesimo tertio.

¶ Forma absolutionis plenarie.

omps deꝰ ꝛc. Et ego auctoꝛitate domini nostri jesu christi: ꝛ beatoꝛum Petri
ꝛ Pauli apostoloꝛ eius: ꝛ summi pontificis mihi cōmissa: te ab
a pena ab omnib⁹ peccatis tuis oꝛe confessis: ꝛ coꝛde contritis: etiam si sedi aplice sint
omnib⁹ indulgētijs: ꝛ remissionib⁹: quas virtute stationū vrbis Rome dfecut⁹ es: q̄ oīa
eccatoꝛ tuoꝛ: ꝛ eterne vite retributionē. In noīe patris ꝛ filij ꝛ spūs sancti. In articulo
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Fragment of a plenary indulgence certificate CCA W-S-11-10 endpaper 1

Pilgrims used to come to Canterbury Cathedral to visit Becket's shrine. Sometimes in their thousands. Today's tourists come in even larger numbers, more than a million in some years, to see the cathedral itself, and in particular to admire the mediaeval stained-glass windows, which now act almost as a substitute for the absent shrine.

We have previously looked at some of the cathedral's windows, including the image of Adam, the broken Royal Window, and those known as the *biblia pauperum* windows. That series provided a visual presentation of the parallels or echoes, the 'types' and 'anti-types', linking selected Old Testament and New Testament events and figures, and constituted theological lessons which could be explained to pilgrims making their way along the passageway towards the shrine. As the pilgrims came even nearer, the second series, known as the 'miracle windows', was more self-explanatory since they vividly depicted the numerous cures attributed to Becket's intercession. The location of these windows was part of their function. Between the two series was the Treasury.

Before considering the Treasury, I want to focus first on just one of the miracle windows, the last in the northern ambulatory series immediately before the Corona is reached. The prilgrims would have just come past six miracle windows, each filled with between sixteen and thirty coloured glass panels with images of specific miracle stories. As the hopeful pilgrims passed each window a guide could have pointed out to them various specific miracles. One can imagine the well-practised patter as individual pilgrims with visible disabilities or injuries were singled out: "Got a broken leg, sir? See that cripple in the picture up there, second from the left. Becket cured him. So, madam, you're afflicted with some kind of scrofula? Don't worry – look up there, middle image: Becket curing someone just like you. Ah, sorry, sir, I can see you're blind. Well, you can't see it for yourself in

the window, but it shows how Becket cured a blind person just like you." And so on. But then we come to the crunch.

last warning

The very last window just before pilgrims were admitted to the actual shrine area is a particularly complicated one, and especially the bottom segment of it, with several panels. One could imagine a competent guide taking as much time as necessary, waiting and pausing the queue while the pilgrim contingent just in front took their time at the shrine. It's a good story to dwell on, after all. And includes what we can recognise as an anticipation of some well-known commercialisation and advertising strategies.

The lowest window segment tells the Fitzeisulf story, arranged in an intriguing way. Not a simple narrative order but one which has to be explained. There are Latin inscriptions which clarify the tale, but an average pilgrim would have needed someone to translate them. It tells of an aristocrat's household attacked by the plague, that of Sir Jordan Fitzeisulf, who had actually been a friend of Becket. Again, one can imagine the commentary.

The story begins in the lower left corner, where we see the funeral of the first plague victim, the nurse Britonis: her coffin under a pall is carried on a bier by four men, a priest in an embroidered stole walking in front, with a holy-water sprinkler. Then, next along the bottom row of panels, the second victim dies, Sir Jordan's young son William, aged ten; the parents stoop over his bier which a priest sprinkles with holy water. Then in the right hand corner, pilgrims from Canterbury arrive with the especially miraculous holy water of St Thomas himself. The mother lifts the child's head while Jordan pours the holy water into his mouth.

Now we switch to the top left corner pane: Jordan receives from his wife some coins brought in a bowl, and places two in each hand of the child, to be presented as a thanksgiving gift to the saint. And in the middle image, the dead child is duly brought back to life by the holy water of Thomas. He sits up and feeds, with the parents at the bed-ends giving thanks. That's surely encouragement enough to pay one's respects properly and to make some suitable payment to the shrine in exchange for whatever healing you are in search of. A guide's exposition could simply stop there. Message delivered.

But the inscription on this pane is important. It reads: *hic pver erigitvr sanvs nec martir aditvr.* Roughly translated : Here the boy rises, healed, but the martyr is not approached. Which means that the parents did not go, as promised, to the shrine to give thanks, and they didn't donate the coins as promised. So what does Becket do?

Phase two of the story: in the next image Saint Thomas himself, with crozier in hand, appears to a sleeping leper named Gimp and orders him to

warn Jordan of what will happen if he fails to perform his vow. The original image of Thomas at this point was, of course, defaced at the Reformation.

Now we move to the middle row of images: the parents come to Gimp, who sits up to give his message. Which they receive and clearly understand — but still don't act on.

And so to the final act and the crunch lesson for any listening and expectant pilgrim.

The leper's warning from Thomas has been ignored, the promise not kept, and they still haven't given the offering, so – right in the centre of the whole composition – the elder son of the household now dies. And just so there's no doubt, Saint Thomas himself, armed with a sword, visibly hovers in the air above the son's corpse while the rest of the family are too ill even to rise from their chairs.

Finally, the message strikes home, and in the concluding scene the parents at last make the promised offering of gold and silver at the shrine. The final message is clearly that if while on your pilgrimage you've been praying for a miracle, and while shuffling along in the queue you've been promising you'll make some suitable offering, you'd better not forget it! Now, you may go to the shrine! How's that for a Canterbury tale?

Remember where this window is located. Blatantly, this particular window panel is a form of threat or even blackmail, but the whole wall of images showing the miracles operates as a kind of on-site inducement, an enormous advertisement proclaiming the wares on offer, even with individually personalised messages, and including an extensive product-placement strategy, with the special Becket holy water prominent in several scenes.

When my six-year-old said that the cathedral was 'a huge building full of stories' she may have had in mind these stories in the miracle windows, which are now sometimes told with a great deal of additional and vivid detail, with the more 'curious' stories singled out, such as the mad lady with the frantic hair or the somewhat peculiar maladies visibly displayed. But the original point and impact of the miracle series has now been displaced by an invitation to admire the artistry of the glass itself.

The windows illustrated and exemplified a two-fold pressure on the pilgrims: reinforcing their desire for a cure through Thomas's miraculous powers, but also offering a clear threat of saintly retaliation for non-payment of any promised donation. The visually prominent gold coins and the explicit and brutal message of the Fitzeisulf window prompts some thoughts on the overall financial aspects of the cathedral, and the complicated relationship between the building itself and the beliefs which sustained it. I want to explore what we might call the economics of the monastery, with some preliminary reflections suggested by the 'Treasury' which is strategically situated between these two sets of windows.

Just before the steps up to where the sequence of 'miracle windows' begins, there is an opening into what seems an empty side chapel, entry to which is barred by an imposing iron gate. It's clearly off-limits to visitors and if you peer through the grille which separates this rather odd space from the ambulatory it is difficult to make out what function the room has. There are only somewhat blank walls and a door in the far wall opposite. In some tourist guides to the cathedral it may be referred to as St Andrew's Chapel, while on diagrams of the ground plan it is sometimes labelled 'The Treasury'. We know that in the later mediaeval period there were at least eight collecting boxes located around the cathedral, rather like those boxes for small donations to the poor sometimes found in churches today. We might think of the 'Treasury' as a very large collecting box. But throughout the pre-Reformation period substantial sums were potentially involved, and not primarily as collections for the poor.

The current use of the whole space is indicated by the term 'vesterarium' or vestry, meaning the place where the clergy get robed in their vestments for liturgical services. But if you examine the exterior of this almost self-contained building its other function is signalled by the heavy iron bars visible on the few windows and by the overall construction. It was clearly designed as a secure space, and the ground floor area consists of a series of open arches, enclosing an otherwise empty area under the first storey, in order, presumably, to make the task of any would-be thief breaking in from outside rather more difficult.

One standard account offers this summary of the building:

> The Treasury was constructed in the early 1160s and seems to have been part of a programme of centralisation whereby the various functionaries of the monastery's financial system were brought under the control of a single official. The cellarer, the chamberlain, those in charge of the granary and even those in charge of the farms became exclusively dependent on the Treasurer and it was only the sacrist who was able to collect a small number of rents without recourse to the central office. Previously the rental income from various estates had been assigned directly to the several functionaries of the monastery. As we have it today, there is a further storey which was added in the 15th century. . . the building . . served as a Treasury, but this term is not necessarily self-explanatory since at various times the building has also been known as the vestarium, sacristy, secretarium, . . and the auditorium, the latter denoting the audit house, the other terms indicating primarily the function of providing a robing chamber or place where the liturgical books were kept.

Today what is sometimes referred to as 'the treasury' is simply an area in the crypt cordoned-off for the display of a few golden chalices, silver monstrances, and other valuable items. These include some perhaps surprising objects, such as the crozier, cope, and slippers of Archbishop Hubert Walter, discovered when his tomb was excavated in the 19th century. These surviving items of burial paraphernalia might remind us that the magnificent vestments used in the monastic and cathedral liturgy could themselves be of very considerable value, often made of fine silk or other expensive fabrics and decorated with jewels and edgings in precious metals. We know of at least one instance when a liturgical cope or cloak was deliberately burned by the monks in order to extract the gold thread from it. It is no surprise that such valuable robes were kept in the 12th-century Treasury.

The location of the Treasury in the north ambulatory was clearly convenient for the clergy to don their expensive vestments for the liturgical services performed just across the passageway, in the sanctuary of the cathedral. When the Treasury was built in the 1160s there was obviously as yet no Becket shrine, and after the murder in 1170 Becket's body had remained in the crypt for fifty years until the ceremonial 'translation' of his remains into the new shrine in 1220. Thereafter, the Treasury was next to where the pilgrims might offer their donations as they progressed towards the cathedral's single most valuable asset, the body of Saint Thomas Becket. Any monks assigned the task of explicating the two sets of nearby windows could also have prompted the pilgrims to make a donation on the spot, or at least to commit themselves to some suitable future recompense if they benefited from their visit to the holy shrine. Hence the implicitly threatening message of the Fitzeisulf window.

It's worth indicating the various items which might have been included in the Treasury or its companion building, still known as 'The Old Checker', a small tower which is visible from the outside as part of the present cathedral library. The name recalls its original function as the 'Exchequer', the place where the monastic accounts were audited and partly archived, a term derived from the 'checkered' cloth on which financial calculations were made, in effect almost literally a 'spread sheet'.

As well as everyday accounting documents, there would have been records of the various charters and contractual agreements which provided the legal basis for the claims by the monastery or cathedral to the possession of extensive lands, together with copies of endowments or bequests concerned with, for example, the provision of chantries or gifts given in exchange for promises of prayers and masses to be said on behalf of a benefactor. There must also have been a secure place for the considerable sums of money the monastery and cathedral generated and spent. The cathedral Treasury would thus have been not dissimilar to the Royal Treasury, which also underwent a process of administrative reform in

the 12th century. The author of the *Dialogus de scaccario,* dating from the 1170s, wrote:

> You must know that *thesaurus* [treasure] sometimes means coined money, gold and silver plate of different kinds, and changes of raiment. In this sense it is said, "where your treasure is there will your heart be also" [Matthew 6: 21] . . for the place in which treasure is stored is also called thesaurus, wherefore that place is named the Treasury as it were *auri thesis* i.e. placing of gold. . . There are several things in the vaults of the [Royal] Treasury which are taken about the country . . *Domesday Book*, the *Roll of Demands*, which is called the *Writ of Farms*; the great yearly *Rolls of Accounts*, a multitude of charters; counter-tallies and *Rolls of Receipts*, *Royal Writs for the Issue of Treasure*, and sundry other things which are needed for daily use while the Exchequer is sitting.

As with the Royal Treasury, documents from the Cathedral Treasury survive in considerable quantities. The fifth and eighth Reports of the 19th-century Historical Manuscripts Commission included as appendices over a hundred double-column folio pages simply listing brief indications of the extant Christ Church archives, including perhaps a thousand documents relevant to the financial history and everyday economic business of the monastery and cathedral.

Some examples can indicate what generations of scholars have excavated from this surviving accumulation of economic data. The density of detail is deliberate, as a way of dispelling any merely imaginary or fantastic notions of the cathedral's wealth.

accounts

R. B. Sheppard, who heroically compiled the lists in the HMC volumes, also edited the *Literae Cantuarienses*, the 'letters' of Canterbury, for the Rolls Series in 1888. In his introduction he outlined the accounts of income and expenditure detailed in the records of the monastic official known as the Treasurer, which have partially survived for the 13th and 14th centuries.

> The first account in the records is that for the year 1207 . . The first item records the balance carried on from the previous year – 4s. 7d. – and then follow the amounts received for arrears, rents, manorial dues, tithes, synodals, oblations, and obventions or casual receipts not falling under any of the regular heads. Among these latter are money received for the sale of pigs fattened on the refuse of the kitchen, of timber, and of worn-out or superfluous horses. The total income for the year in question reached £1,460. 10s. of the money of the time, whilst the expenses only amounting to £1,425, 15s. 7d. left a balance . . at the end of the year. In this year before striking the annual balance the

Treasurers deducted under the heading: *Ex hiis deciderunt in igne, casura, cambio, et falsina* [loss by melting, mischance, exchange, and base (defective) money] £9. 17s. l0d. This heading occurs in each year's accounts, but the amount of loss was extraordinarily large in the year in question . . the *fretina* [were] the miscellaneous foreign coins received from pilgrims . .

In 1219, which was an ordinary year, unmarked by any great festival, and the last before the *translation* of the relics of St. Thomas from the obscure *tumba* [tomb] in the crypt to his magnificent new shrine in the upper church, the total receipts, including £80 *de emprunto*, are set down at £1,527, 13s. $9^{1/4}$d. In the next year, when the splendid ceremony of the *translation* took place, it is not surprising to find that the attraction of the festival and the immense concourse of royal and noble pilgrims almost doubled the monastic income at one bound. It is to the credit of these pilgrims, coming together out of all lands, that from the gross receipts of the year, amounting to £2,707, 12s. $9^{1/2}$d., the Treasurers only claimed *allowance* of £4. 3s. 6d. for exchange and base coin. The liberal contributions of the visitors – the *oblationes* of the accounts – of course was the chief source from which this flood of prosperity rolled in upon the Monastery, since it is plain that the usual rents and feudal dues would, in spite of the rush of visitors, remain an almost fixed quantity.

From the year of the translation onwards the income of the Convent remained permanently improved, and only on one or two occasions, during the period of nearly two centuries covered by these accounts, fell to so low an amount as before the inauguration of the shrine. For the six years preceding 1220 the receipts from all sources averaged £1,460. 14s. $0^{3/4}$d, whilst for 1220 itself and the five following years the average was raised to £2,340. 12s. Great fluctuations are found in the amounts received, some of which must be put down to promptness and slackness of tenants in their payments, good and bad seasons, and other similar causes; but even with these allowances wide variations still remain unaccounted for . . [with differences between some years] of more than £600, the respective receipts being £1,589, 5s $8^{1/2}$d. and £2,201, 12s, 3d, a difference equal to, probably, at least £15,000 of the money of our own time. (*Literae cantuarienses,* vol 2, pp. xliv ff.)

Shepherd was writing in the 1880s. His attempt to indicate a 19th-century equivalent for the sums he recounts seems peculiarly inapplicable, as would an attempt to use standard economic index tables to indicate the changing value of £1 between, say, 597 and 1540!

More usefully illustrative are the figures from a petition in 1410, cited by G. W. O. Woodward in his *Dissolution of the Monasteries* (1966), which argued that the landed possessions of the English bishops and abbeys would maintain 15 earls, 1,500 knights, and 6,200 squires in the style of living

appropriate to their rank, would also provide for the maintenance of 100 alms-houses, and would still leave £20,000 a year in the hands of the King. One would still have to decide today's counterparts of expensive earls and meagre almshouses.

Those who are nevertheless happy to think in bare figures can consult R. A. L. Smith's *Canterbury Cathedral Priory: A Study in Monastic Administration* (1943) in which he usefully compiled the fluctuating number of monks in Christ Church, from the death of Lanfranc in 1087, when there were nearly a hundred monks, through 1125 (between 140 and 150), 1298 (below 30), 1330 (about 65), 1376 (only 46), 1451 (87), and 62 around 1500. These numbers can then be compared with the overall figures he calculated from the treasurers' accounts, giving the total revenue the monastery enjoyed at various times: about £1,400 around 1200, in 1292 just over £2,060, in 1331 a net revenue of £2,540, in 1411 a high point of £4,100, but in 1437 a reduction to £2,381, in 1454 to £2,115, and in 1456 to £2,059, and by 1468 the revenues had fallen as low as £1,828, but by 1473, a considerable recovery to £2,841. At the time of the Dissolution the annual income of the priory averaged £2,349. 8s. 5d. On the basis of both sets of Smith's figures one might try to work out the 'average income' per monk at various times.

Any such nominal monetary calculations may be less informative than considering a detailed example of the income derived from a single source, for the benefit, in this case, of the Archbishop himself. F. R. H. Du Boulay, in *The Lordship of Canterbury* (1966) summarised the income the Archbishop derived simply from holding the Prebend of Deal:

> By the 13th century this was rendering, besides the profits of its demesne fields, £2. 9s.1d in cash rents, together with cocks, hens, eggs and male hawks, and also a twent-first part of the oblations in wax, of the tithe of fish taken at Dover, and of offerings on the feast of Saint Margaret and our Lady's Birthday . . Rents in kind were habitually called *consuetudines* or occasionally *redditus mobiles*. . . In the thirteenth century costumal they are itemised with immense prolixity. . Each manor owed large numbers of hens and eggs, originally the Christmas and Easter presents owed to the monks but ultimately by the archbishop from his own manors. Almost as common was the rent of plough-shares. Other renders are found with more or less frequency upon different manors: plough-wheels, carts, iron, horse-shoes, herring, eels, cummin, pepper, oats, barley, salt, currycombs (from Wimbledon only), oysters (from Teynham, not far from Whitstable) and ploughtails (from Aldington). From the woodlands was paid an entirely separate set of rents . . Pannage for the right to pasture pigs together with *danger*, which was a fixed payment in 'damage' or compensation for the natural lack of oak or beech mast from which the wood suffered many years especially after bad summers and which thus involved the Lord in loss . . By the thirteenth century not only his woodland rents and services but

virtually all others were being paid in money, yet the superb archaism of the account rolls preserves the full description of the *consuetudines* year by year until the end of the mediaeval period. (p. 177)

Du Boulay variously summarises the net annual value of the Archbishop's own lands for several specific years between 1066 and 1535, for example: 1086: £1,246; 1168: £1,596; 1274: £1,724; 1292-95 an average of £2,616; 1446: £3,049.

A different kind of detailed study concerning the later 13th century by Mavis Mate focussed specifically on property owned by Christ Church, both agricultural land and urban buildings, and particularly one-off property purchases as investments for rent yielding a regular form of income – remember William Urry's use of the cathedral's rent rolls, mentioned earlier.

In his purchase of land for re-leasing . . [Prior] Eastry seems to have been as successful as anyone else. . . At Small Chart the priory bought nine acres of land, three acres of one virgate of meadow and 3s. 8d. and six hens of annual rent which belonged to William le Kyng for £7. The land was then farmed out for 26s. 8d. a year. At Godmersham the lands and tenements of Richard, son of Roesia, that is, one messuage, thirty six acres of arable land, one acre of meadow and three and a half acres of wood, were granted out for 60s. 0d. a year.

. . in 1292 the treasurers spent £58 17s 2d. on rebuilding within the city, including new houses within the Jewish quarter, and in 1295 another Jewish house was acquired, this time from Nicholas Raven, one of the squires of the King's brother. Three years later a further £40 was invested, making nine stone shops in the Burgate. At the same time lands, rents, and tenements were being exchanged with St. Augustine's Abbey and the Archbishop of Canterbury.

Similar policies were followed in the early fourteenth century. In 1305 the priory acquired a tenement in the parish of St. Mildred and in 1312-13 paid John de Stablegate £6 13s. 4d. for two messuages, and a tenement which had belonged to his parents. Later, in the 1320s, the monks acquired 4s. rent, a house, and a plot in the Queningate, a messuage adjoining the lane called Stourstreet, and a building in the parish of St. Alphege. In addition more new houses and shops were put up in the Burgate and Stourstreet and next to the cemetery gate. Altogether between 1290 and 1332 the priory spent £234 5s. 3d. on new building within the city of Canterbury. The total effect of all this activity can be seen in the rising rent-roll. The treasurers' receipts from 'houses and shops', but excluding gavel-kind rents, had averaged £78 a year from 1285-90. By the 1330s they had reached £125 a year, of which £14 14s, 6d. came from former Jewish property.

(Mavis Mate, 'Property Investment by Canterbury Cathedral Priory 1250-1400', *Journal of British Studies*, Vol. 23, No. 2, 1984)

I could continue. At perhaps mind-numbing length. Numerous similar local investigations and studies of the extraordinarily detailed monastic accounts could be cited. Dom David Knowles, the great historian of the monastic orders in England, always emphasised that the overall monastic wealth was derived from several different kinds of income stream and that each required its appropriate scholarship. However, we cannot avoid inquiring at least briefly about the financial contribution of Becket's shrine itself.

Broadly speaking, as first established by C. E. Woodruff in a 1932 article in *Archaeologia Cantiana*, in the thirty years or so immediately after the murder the offerings at the shrine averaged around £420 per annum. In 1220, the year of the translation of the relics, they spectacularly increased to £1,142 but then steadily declined throughout the middle of the thirteenth century until the latter half of the fourteenth century, when the cult of St Thomas was revived, as famously celebrated in Chaucer's *Canterbury Tales*. In 1370-83 the shrine offerings averaged £545. But the following century saw a remarkable fall. Only £66. 15s. was received in 1436, and a mere £25. 6s. 8d. in 1444. By the time of the Dissolution the donations to the shrine averaged only £36. 2s. 7d. a year. The Fitzeisul window was clearly no longer doing its job.

Canterbury plc

So, given all this, what are we to make of this now rather nondescript room called the Treasury? A complete examination of the contents of the Treasury at different periods, and its various changing functions, would involve writing an economic history of a complex double institution, the monastery and cathedral, including the complicated issue of the varying allocations of funds at different periods between monks and archbishop. Such a study, even one covering only the years from 597 to 1540, would be a formidable exercise, not least because of the difficulty of estimating the modern value of the income and expenditure involved, translating mediaeval financial dealings into our contemporary money terms.

In general, given the scope of its financial dealings and assets, we might try to think of the combined cathedral and monastic community as partly akin to a familiar kind of modern corporation, with a complicated multi-stream income, including rents from tenants, sales of produce from farms, profits from mining and fishing rights, but also receiving gifts and endowments, payments for the prayers and masses offered up by the monks and priests on behalf of those making offerings, and so on. But apart from dedicated economic historians, what interest does the Treasury now have, and perhaps today's visitors are right to pass it with barely a glance.

However, despite the difficulties of making the assessment, one overall figure is worth emphasising and thinking about. Just before the 'dissolution' of the monasteries in the 1530s it was claimed that 'bishops, abbots, priors, deacons, archdeacons, suffrages, priests, monks, canons, friars, pardoners and summoners' had 'gotten into their hands more than the third part' of the wealth of the kingdom. This patently polemical estimate was given in Simon Fish's decidedly anti-clerical *A Supplication for the Beggars* in 1529, and it has been somewhat uncritically repeated ever since. In 1717 another unreliable calculation argued that well over 50% of the land of the kingdom had once been in monastic possession.

A more cautious estimate by G. W. O. Woodward in 1966 was restricted to the probable annual income of the religious orders, estimated at perhaps £175,000 in 1535, 'or nearly three quarters as much again as the average annual income of the Crown'. The relevant Wikipedia entry offers a figure for the additional annual income gained by the Crown from the dissolution: 'Once the new and re-founded cathedrals and other endowments had been provided for, the Crown became richer to the extent of around £150,000 (equivalent to £97,356,000 in 2019), per year, although around £50,000 (equivalent to £32,452,000 in 2019) of this was initially committed to fund monastic pensions.' Most recent scholars tend to avoid offering any firm comprehensive figures for monastic annual income, overall wealth, or total landholding, still less estimating some modern money equivalent. But it is clear that on each of these counts the monasteries had undoubtedly accumulated a very substantial share of national assets.

According to an estimate of the monastic and clerical population of England by G. W. Bernard in an article in *History* in 2011:

> There were nearly 900 religious houses in England, around 260 for monks, 300 for regular canons, 142 nunneries and 183 friaries; some 12,000 people in total, 4,000 monks, 3,000 canons, 3,000 friars and 2,000 nuns. If the adult male population was 500,000, that meant that one adult man in fifty was in religious orders.

Putting together the various figures so far surveyed, one might now estimate comparable figures for how much wealth and income the richest 2% of the UK population currently owns and controls. Perhaps G. W. Bernard was correct when he claimed that 'The dissolution of the monasteries in the late 1530s was one of the most revolutionary events in English history'. The 2% were indeed forcibly dispossessed. But what kind of revolution was it?

I want to explore that 'revolution' by focusing on a peculiar element of the monastic economy which I think raises some issues for our own time. I certainly won't attempt any full and systematic analysis of the financial activities undertaken by the monks and archbishops. But it is worth asking

what they *did* with all that money. And in particular what did they do *for* all that money?

a busy life

Consider one more quotation, from the introduction to a 1907 edition of the sacrist rolls of Ely Cathedral, where the editor F. R. Chapman gives an account of the busy life of the sacrist, in this case Alan of Walsingham, from Michaelmas 1322 to November 30th, 1341:

> The status of the Sacrist in the Monastery may be most truly estimated by the important and varied duties which were assigned to his office; and the Ely Sacrist in the years before us had indeed a busy and many-sided life, by reason of the multitude of obligations which were thrown upon him. . .
>
> Besides the burden of the unending cares which consumed his time as Sacrist of a Monastery in which the services seemed to follow one another in rapid succession, he had the management of a considerable staff of minor Church officers employed in the vestry and elsewhere, with the overlooking of the elaborate details for the provision of Hosts and wine for the Altars. Outside the Cathedral, he was the immediate ecclesiastical superior over the Churches and Hospitals in Ely; the Rector of St Cross and of St Mary's, responsible for the Chaplains or curates who did duty at the Altars of those Churches.
>
> Though a monk and a priest he had to supervise not only all the buildings within the Monastery but numerous tenements in and outside the town; he was, too, an extensive farmer, having under his care four separate farms or granges; at times purchasing manors and tenements, renting lands and letting lands; an urban district authority also, repairing roads and building bridges; a judge to visit offences among the inhabitants of the city, an authority for the proving of wills, and withal not only collector but tithe impropriator of all Ely tithe.
>
> He must be constantly on the move, visiting fairs near and far off, making frequent journeys to London, sometimes attending Parliament as the representative of the Convent, sometimes taking his share in the councils of the Benedictine Houses, at Northampton. Year by year he is a manufacturer and provider of some of the chief necessaries of life, and in the market he purchases his store of household things, ginger and spice and all things nice, and if his ways of shopping are not precisely those of the modern housekeeper, there may be useful thoughts, economical and political, to be drawn from the pages of his old fashioned Compotus Rolls.
>
> . . His income being in the main earmarked for special purposes, it is distributed into those divisions which he himself had mapped out. He mends the roads and bridges for which he is responsible and repairs the houses within the circuit of the Monastery, in his granges, or in the

> town. He manufactures candles of wax and tallow. He gives out pittances on the stated days for his brethren in the house and in the refectory, and spreads his table in the hospice of the Sacristy for the workmen engaged in his office or on the Cathedral.
> …It is only by thus entering into the multiplicity of the occupations then accumulating on the head of Alan of Walsingham, that we can understand how great a man he was.

We might share the enthusiastic admiration of this account of an impressively busy and talented figure. Alan is presented as an admirably competent business executive, a reliable middle-manager, a hard-working administrator in a large and complex organisation.

But this crucially leaves aside what was the distinctive 'work' of Alan's organisation in the first place. After all, when trying to make sense of a business corporation today we would normally ask what its primary function is, what does it make, and how does that make money for the corporation. But what did the Ely or Christ Church monastery make? One answer would be prayer. Chapman's portrait registers that Alan was indeed 'a monk and a priest' and that he lived and worked in 'a monastery in which the services seemed to follow one another in rapid succession', those 'services' being the daily liturgical 'hours', the 24/7 activity of reciting psalms, singing antiphons, listening to sacred texts, attending mass. Days and nights of praying. The monastery might even be regarded as a manufactory of prayers.

But 'prayer' rarely figures directly in the financial accounts I have cited. And what is sometimes indirectly indicated as payments for prayer seems to contribute only a very small percentage of the total monastic income. Yet 'prayer' played a pivotal role in the monastic economy and therefore, given the wealth of the monasteries, in the wider mediaeval economy. I want to use the term 'prayer' to indicate a range of income-earning activities and assets, including relics, miracles, masses, chantry priests, and the shrine itself, none of which are typical corporate assets today. But at the core or foundation of all monastic finance was this decidedly odd activity of actually praying. So what sense might we make of an economics of prayer?

relics

Let us first consider the category of 'relics'. In the surviving 'miracle' windows there are some depictions of the central feature of the late mediaeval cathedral. Becket's 'shrine' was a magnificent display of jewels and precious metals, and we can almost forget that it actually housed a corpse, the body of a dead person, though not as visibly as Chichele's gisant sculpture. The corpse was regarded as a holy 'relic' and was by no means the only such relic possessed by the cathedral. The 'Treasury' was where some of these peculiar physical objects were kept.

In mediaeval ecclesiastical treasuries we frequently find quite extraordinary items listed which might seem to us to have little or no value. These can include bits and pieces of human bodies, arms, legs, hands, even heads – though Canterbury seems not to have had too many heads – and we might recall that the familiar phrase 'it will cost you an arm and a leg' derives from the practice of allowing an important ecclesiastic who had taken part in the liturgy for the burial of a martyr to claim as a fee for himself an actual arm or other bodily bit of the martyr.

Such relics were sufficiently valuable that there was a thriving trade in the theft of saintly body parts, the target of what was known as 'furta sacra', sacred theft, including on occasion attempts by the monks of Canterbury Christ Church to steal relics from St Augustine's Abbey and vice versa. One of the most important of Canterbury's relics before Becket was the corpse of Saint Aelphege which King Canute had once helped the Christ Church monks to steal from his previous burial place in London. In 1006, on his own promotion from the see of Winchester to Canterbury, Aelphege himself had brought with him the head of St. Swithun

Here are a few idiosyncratic examples once stored in reliquaries, ivory and copper boxes or caskets, and kept in a cupboard, as itemised in *Inventories of Christ Church Canterbury* edited by J. Wickham Legg and W.H. St John Hope (1902):

> Some of the stone upon which the Lord stood when he was transfigured (or ascended into Heaven?). [*Item de lapide super quem transfiguratus est.*]
> Some of the Lord's table upon which he made the Last Supper.
> Some of the oil of St. Mary of Sardiney, which flowed from the breast and nipples of a certain image of the blessed Virgin Mary.
> Some of the prison whence the Angel of the Lord snatched the blessed apostle Peter.
> Some wool which St. Mary the Virgin had woven.
> Some of the oak upon which Abraham [*sic*] climbed to see the Lord.
> Some of the clay out of which God fashioned Adam.
> [*Item de limo terre unde plasmavit deus Adam.*]

If we ask why such items as fragments of bone and slivers of ancient flesh were so treasured, we might initially think of the reverence paid to impressive and worthy people: that keeping their remains or 'relics' was an expression of admiration or respect for saintly individuals, as one might today keep and honour the ashes of a beloved but deceased relative, in a cremation urn. Recall the pious concern for the dead recorded in John Stone's Chronicle or the numerous memorial tablets in the nave.

But these relics were also income-earning assets, guarded as 'treasure', not buried in a cemetery, though partly transforming the cathedral itself into a cemetery. Clearly, there was monetary value of a familiar kind if a saint's

arm was encased in gold, which could always be melted down in an emergency. But the more lucrative value was located in the alleged capacity of the saint whose 'relic' was preserved to intercede with heaven, to act on behalf of those who paid it due homage. The monks could expect a donation in exchange for a supplicant being allowed to invoke the intercessionary power of 'their' saint. In particular, those who were allowed to come into direct contact with a relic had to pay for the privilege. We can recall Erasmus's sardonic account of his own visit to the 'treasures' of Canterbury. Though Legg argues that the head enclosed in silver which Erasmus says was shown to him in the crypt was possibly a newly-acquired relic of St. Dunstan and was certainly not a relic of St. Thomas himself.

Obviously, the authenticity of many alleged relics was highly dubious – not least the clay from which Adam was made! In any case, a lock of hair or a shin-bone would hardly figure in today's corporate financial reports. This was a form of wealth we no longer acknowledge or recognise. The dominant reaction in England today, I am sure, would be an almost automatic rejection of the notion that we might pay a fee to visit, or give a donation to touch or kiss, a fragment of a corpse or a piece of clothing claimed to be that of a deceased holy person, even if the attribution were reliably evidenced.

Yet we might register that such practices remain widespread, in various forms, in Catholic churches across parts of Europe, or remember the once much-visited mausolea of Lenin and Mao, or the large numbers of fans who still visit Elvis Presley's Graceland. Items associated with 'celebrities', living and dead, can command high prices: a guitar played by Jimi Hendrix, trainers worn by Michael Jordan, a used ticket to an early Beatles' concert. In these cases there is presumably no assumption of efficacy beyond a vague or sentimental notion that you are making some kind of contact or connection with the dead celebrity. Yet people pay entrance charges and give donations simply to visit these secular relics or mere simulacra of them. An entire tourist industry rests upon some kind of belief that, for example, one is visiting a real 'Disney World' with authentic 'characters' and exhibits.

We can recognise that mediaeval relics could be 'real' in one sense but fake in another. Passing off the bones of a pig as those of a saint was a different kind of falsehood from claiming a spiritual efficacy for a relic which might indeed have been a genuine fragment of a saint's corpse. But could any relic be 'genuine', in the sense of being the kind of object that pilgrims believed them to be? The charters in the Treasury might be forged, and monks were notorious for such practices, but there could after all be genuine charters. The jewels on a chasuble might be artificial, mere costume jewellery, though they still glittered and impressed. So there could be properly authentic charters and real jewels, and in one sense there could be convincingly authenticated relics. Becket's corpse was a real corpse.

However, the accusation increasingly made at the Reformation was that *no* relic, even if a genuine fragment of a real saint, could actually have the

power claimed for it, but only promised a fraudulent effect thought or believed to be attributable to it. No relic could be a 'genuine' relic in terms of what it is supposed to be able to do. Despite such objections, and even if some miracle-working saints might be proven never to have existed, it had remained a major component of the belief structure of the mediaeval period that some saints did indeed exist and could authentically perform miracles. The Reformation tried to sweep all that away.

What if you don't believe in miracles anyway? As most of us no longer believe in Becket's. Which is why we now admire the miracle windows while discounting their content and message. A guide would not be likely these days to claim the truth of the stories depicted but only admiringly point to the artistic skill with which they are depicted. At the Dissolution it was often a charge made against the monks as justification for closing down the monasteries that they had indeed practised fraud. The claim was particularly made that much of the accrued monastic wealth was based on exploiting a belief in purgatory, a false belief in a spurious location. But how could a successful economic practice and structure be based upon such a fraud?

prayer work

Even if we now adopt a sceptical attitude towards relics and regard their alleged efficacy as essentially hollow, if not deliberately fraudulent, there perhaps remains a reluctance to confront the notion that the extensive activity which arguably underpinned the entire monastic and wider ecclesiastical financial structure might itself have been merely empty or hollow. We might acknowledge that relics were not in many cases deliberate frauds, and their efficacy was believed 'in good faith', yet it is a considerable further step if we begin to regard the essential or distinctive 'work' of the monastery, that of 'prayer' in its various forms, as itself based upon a 'false' belief, even if in good faith. After all, while relics and miracles might now be discounted, some form of belief in and practice of 'prayer' seems to remain quite widespread.

Nevertheless, the activity of prayer would still be an odd one to include in a modern corporate spreadsheet. In particular, how could the business of paying someone else to pray on one's behalf find a place in the categories of modern economic analysis? What 'value' should be entered against it to justify, and not simply record, any income it generated? Yet if we regard payment for prayer as providing the original or core income stream of the whole monastic economy, and as at least indirectly but fundamentally underpinned by the associated donations, gifts, and inheritances, what did this institution actually do to earn or justify its wealth? And are there modern parallels?

One clear instance to consider is the gift of some land to Saint Augustine's Abbey by Wulfrid in 813. After a list of the lands that Wulfrid is donating, the text of the gift reads:

> In return for this gift and all the benefits which I have done them since our common congregation by God's grace was established, I implore this my *familia* ever to remember me with alms and psalmody and the celebration of masses for the repose of my soul. And I make this condition in giving this land . . Moreover, that land which Cynehard the deacon had, and which he gave to me, and to him it had been given for his own inheritance by Kings Egbert and Aethelwulf – that is, 85 crops (*segetes*) with the bulk of the same field (*agelli)* – to that *familia* aforesaid in Canterbury I will give it after my days for the salvation of the souls of both of us: and on this condition, viz. that always night and morning, when the brethren go to the church of the blessed Peter the Apostle for the accustomed chant in supplication for his soul they should chant the Lord's Prayer, the *Pater noster*.

This is clearly an exchange of land for a promise of prayer, formalised in a charter. Or consider the more informal letter from King Ethelbert to the missionary Boniface, about 750:

> I am sending to your reverence with my devoted affection a few little gifts: a silver gold-lined drinking cup, weighing three pounds and a half, and two woollen cloaks. We are not sending these gifts with the purpose or expectation of receiving any earthly profit or return; but rather on bended knees begging you what is far more necessary, that in these evil days of manifold and unexpected troubles and in this world is so filled with scandals you will deign to aid us with the frequent support of your prayers.

There is a substantial modern critical edition of the early charters concerning Canterbury which survive up to the Norman conquest, and by that date the monastery and the archbishopric had already acquired by mainly royal and aristocratic donations a substantial amount of the land and other assets which would largely be retained until the dissolution in the 1540s. In return the monastery undertook to pray for those numerous beneficiaries. Even if in later periods such landed possessions were regularly traded and exchanged in order to increase their value, and Priors such as Eastry became proficient investors in rented property and so on, the basis upon which the wealth was acquired and continued to be accumulated was that the monks had been or were being paid to pray.

We can in effect regard the various other forms of income outlined earlier as ancillary to and derived from this central economic transaction, of donations in exchange for prayer. But in that case, how do we make sense of a major section of the mediaeval economy which sustained a great deal of the wealth of the country but was derived from such an activity? If on this basis a tiny percentage of the population could own so much of the

land, we might perhaps ask about our present faith in the impressive pyramid of financial assets and dealings which we currently take for granted and which, also, generates similar disparities and comparable wealth for a mere 2% of the population.

After all, relics are not a unique case of belief or credulity as a basis of financial value. Gold itself has always had a dual function, both beauty and wealth, and was once regarded as the appropriate ornament of heaven itself. Was 'the gold standard' an instance of credulity, of believing in something not intrinsically valuable? The inhabitants of Thomas More's *Utopia* (written shortly before the dissolution) would not have agreed with us on the value of gold, still less base their economy on it. Relics too had a double aspect: what users apparently believed they could do, and what can be regarded as their actual primary function, which was to raise money for those who owned the relics.

One might say much the same about, for example, the double function of today's social media platforms, as not primarily about facilitating social communication but designed to hoover up personal data for profit. Or credit cards, as not produced in order to facilitate money transactions but rather to generate debt and to accrue interest for the company which issues the card. One may not consider the monks to have been engaged in a deliberately fraudulent or self-deceiving activity, but even if they sincerely believed in their own practice of prayer, though the primary function of that activity was 'really' to generate income, how did it do so?

If the logic, or theology, underpinning and justifying the very successful economic activity of 'prayer' is regarded as invalid might it also be the case that much of our own economic and financial order is underpinned by a similar kind of hollow activity, a false belief or mistaken premise. In England the entire monastic system was swept away within a brief decade or so, in a rapid series of actions, by a relatively small group of state-authorised agents, a transformation which would have been almost inconceivable only a short while before. We can recall Prior Goldwell's pride at the recent impressive refurbishment of his gateway and the completion of the stupendous Bell Harry tower – just before the very system which had sustained and financed those achievements was dissolved, leaving only the cathedral church itself to be incorporated into a transformed ecclesiastical configuration. We might then contemplate, say, the impressive skyscrapers of Wall Street or Canary Wharf – and perhaps imagine those too as bare ruined shells.

The historical moment now labelled 'the dissolution of the monasteries' and regarded as primarily a component of a religious 'Reformation', might also be seen as the enforced eradication of an entire economic mode. The 'dissolution' may have provided a 'new foundation' for the Church of England to continue, but from another perspective it involved the state appropriation of massive monastic assets and their redistribution, largely consolidating and effectively subsidising an existing class of landowners

who suddenly benefitted from the centuries-long 'primitive accumulation' which had been pursued by the now dispossessed monastic orders. Though various accounts tentatively locate the emergence of 'capitalism' very particularly in England in the early 16th century, the sudden transfer of ownership of an entire sector of the economy is rarely emphasised in that context. If, however, we consider the monasteries in terms of an economic analysis we might ask whether the imposing structures of today's apparently indispensable financial capitalist system might some day, however currently inconceivable the notion, be subjected to a comparable rapid and drastic 'dissolution' or revolution.

economics of prayer

The issue which intrigues me is that the monastic land-holdings and other economic activities were largely successful, if we regard them as financial enterprises for which we might write a fairly standard economic history. But they were not standard economic enterprises, and quite where in that economic account would we fit the contribution and function of being paid for prayer? What kind of an 'asset' was prayer and in what sense did it 'earn' money.

Obviously, 'prayer' itself was not an object which could be found in the Treasury. As a practice or activity it could perhaps be located in the choir, the various chapels, and the monks' own cells. Perhaps the act of praying should not be seen as an 'economic' activity, but as an odd kind of imaginary activity, not wholly distinct from other forms of cultural behaviour, including the singing of music in the choir. We do, after all, now pay other people to sing for us, in various situations and modes. The cathedral itself is today regarded by some as a kind of cultural 'relic', and as such undoubtedly remains a revenue-earning asset, not only in the entrance fees charged but thanks to the predictable souvenirs and proliferating trinkets on sale in the cathedral's own shop and throughout the city. Tourist revenues derived from visitors to the cathedral are still an important element in the overall Canterbury city economy.

Yet what if we do try to think explicitly about 'prayer' in quasi-economic terms. There is a danger of formulating the issues anachronistically, assuming a market economy or mentality which was not wholly prevalent until a later period. So while the tone of what follows is admittedly tongue-in-cheek or mildly irreverent, it is intended to provoke questions. Some readers may even frown upon any rhetorical comparison or linguistic conflation between the financial and the divine economy, as a kind of inappropriate blasphemy. In *Dubliners* James Joyce has sarcastic fun at the expense of a preacher who exhorts his congregation of Dublin businessmen to make their accounts straight with God, to weigh their balance sheet of merit and sin, and so on.

Yet, if now the dominant ideological framework is indeed a developed stage of finance capitalism, why object to utilising the most respected vocabulary of our own day to cast light upon the revered practices of a previous epoch. Or does a *sotto voce* objection to doing so indicate a sneaking suspicion that somehow the vaunted stability of our present dominant economic mode is rather more vulnerable to a sceptical undermining similar to that which so spectacularly eroded confidence in the earlier belief system? Does indicating, for example, a degree of parallelism between the highly successful monastic practice of selling prayers and the opaque but lucrative operations of Wall Street or the City, perhaps suggest that if this branch of the divine economy could unravel and be historically replaced, perhaps the devaluation of finance capitalism itself is not unthinkable.

drug trade

We can begin with one economic analogy difficult to ignore: the suggestion attributed to that 19th-century scourge of capitalism, Karl Marx, that religion was 'the opium of the people'. Conversely, others now characterise drugs, opioid, cocaine, heroin, etc., as the new religion of the people. Such comparisons concern not only the effects upon an individual but recognise that the drugs trade, like the religious institutions, comprises a powerful global organisation. Marx may well have had in mind the First Opium War, that undoubtedly aggressive British sales campaign to sell Afghan poppies in reluctant China. It's always worth adding that Marx, characteristically, also recognised religion as 'the cry of a heartless world' and capitalism as a dynamic historical success, even if both were in his view eventually doomed. We might feel less sanguine about the eradication of the current global narcotics trade.

According to this notion, what drugs and religion allegedly have in common is a debilitating effect on sensibility and the semi-voluntary misuse of one's brain. The analogy is perhaps worth pursuing in terms of the relation between the substance peddled and the effects sought and achieved. While actual pharmaceutical products may physically engender a mental change, sometimes experienced as enhanced consciousness or expanded awareness, the effect upon some believers of swallowing what they believe to be the body and blood of Jesus himself can, it seems, be highly similar, even triggering an apparent mystical communion with the whole of reality, an acute sense of self, or non-self, an impression of being in touch with a divine entity, the hearing of voices, an overwhelming emotional experience of bliss and ecstasy, and so on. As vividly recounted by the Rhineland and later Spanish mystics.

Perhaps the monks exploited a formula that could even dispense with any chemical input apart from blessed bread. If so, their business acumen was impressive, since in addition to encouraging believers to believe more

intensely, as it were, they persuaded their customers to pay the dealers to take the drug themselves. The practice of prolonged praying, perhaps of intense meditation, especially in conditions of bodily tiredness, in the cold of the night-hours, with an inadequate diet and other deprivations, might indeed, it seems, help to induce states of enhanced awareness, or of stupor. Nevertheless, if awareness has to be awareness *of* something, much of the interpretation of the experience remains problematic, as the later writings of Teresa or John of the Cross concerning the dark night of the soul emphasise.

It may of course be unfair to compare monastic orders with the drug mafia, or the priesthood generally with today's cocaine racketeers, but the mediaeval clerical hierarchy arguably made – adjusting for inflation – almost as much money as current cartels. Whole economies today partly depend upon an extensive drug trade, at the core of which is the user's own expensively purchased experience, addictively stimulated by particular chemical commodities, while some social systems have relied almost as heavily upon a similarly wide-spread adoption of experience-inducing 'spiritual' practices. In several cultures the overlap between these two modes has been considerable, whether one thinks of Mayan rituals or the conjuncture of Afghan warlords and heroin. It may be argued that a dominant feature of today's more 'developed' economies is not only having made the transition from an agricultural base through a manufacturing phase to economic reliance upon tertiary 'services', but also having gone further along the line of enabling customers to concentrate upon the vaunted pleasures of their 'own' enhanced experiences, utilising a variety of instruments which range from exotic narcotics to pervasive 'leisure' devices and entertainments.

In some highly profitable sectors, 'exchange value' is still derived from manufacturing and distributing a physical commodity the price of which is arrived at by the play of market forces and relations of 'supply and demand'. Or effectively whatever price one's more or less addicted customers are willing to pay for a facet of their own existence to be constantly stimulated, or simulated. That the price of a drug on the street is barely related to its cost of manufacture (including its human cost) is partly due to induced dependency, entailing a form of very localised monopoly: this particular individual addict craving this specific fix or cure. The patent monopolies which underpin the profits of large-scale legal pharmaceutical companies stem from similarly controlling a product which is uniquely required by a patient with a specific condition, a particular illness. The drug dependency of a 'user' is immensely profitable in either sector.

More generally, the modern commercial entertainment industry might also be assimilated to this model, as a legalised 'opium of the people', with its own modes of addiction and dependence, whether in viewer loyalty to long-running television shows or fascination with the current 'A' list of celebrities. Street fashion, gadget novelty, the rapidation of lowered

boredom thresholds, the wearing out of experiential satisfaction, play a large part in keeping crucial economic sectors turning over. The travel industry offers an advanced model in some respects: the constantly shifting, and manipulated, 'need' not so much to go to actual places but rather to 'experience' locales currently selected as desirable destinations, an appeal rapidly exhausted and regularly replaced. Such physical travel is now on the verge of being digitally supplemented by extensions of the videogames industry and the enticements of a virtual metaverse.

To locate some mediaeval religious practices within this overall optic is to recognise a certain similarity, an assonance between several forms of manipulative control of the appropriate market, including echoes of old and new religious wars in today's corporate brand campaigns or drug cartel conflicts, and not least in popular immersive computer games explicitly re-enacting religious crusades and devilish terrors. On the other hand, we don't normally pay others, even the suppliers themselves, to enact such obsessions on our behalf, unless you count actors paid large sums to offer vicarious versions of our desires and ambitions.

So can the provision of religious experiences, drug addiction, and the entertainment industries, be all partly assimilated to the analysis of a commodity-based economy and analysed simply as variations on the production of saleable entities. Karl Marx could provide a more general framework, but an economic theory which begins from the relation between exchange value and what Marx called 'the commodity' does not seem wholly to fit these somewhat askew sectors of economic activity. The use-value of a cocaine snort is quite literally to be consumed, to be ingested into the body of the purchaser and rapidly burned away, while the point of watching a television show or listening to a current hit song is to 'consume' time, to have an alternative experience of that time. This is different from buying a kitchen table or a new car, a quasi-permanent purchase, and is more akin to buying food, consumed not kept, the satisfaction of an immediate need, not the provision of a means for obtaining some longer-term acquisition or accumulation of possessions. In that respect, some parts of the tertiary service sector are now increasingly akin to an agricultural subsistence economy as much as an advanced manufacturing system.

So was prayer a curiously ancillary activity, both superfluous and pervasive, widely if vicariously practised and significantly profitable, but not part of what some Marxists might call the economic base. It may be apposite that consuming a sacred but not 'real' food was central to the mediaeval formation: the supreme 'prayer' was the Mass, the consumption of bread and (at least for the professionals) wine, but eaten for its 'spiritual' rather than any physical nutritional 'value'. However, despite the provocative suggestiveness of the drug or entertainment analogy, it is still somewhat unclear in what sense the commissioning of paid prayer was the production of a 'commodity', or even an intelligible economic activity.

wages

At the centre of Marx's own economic analyses, in a long tradition going back to Aristotle, was the notion of paid labour. Leaving aside the regulations of Canon Law forbidding 'simony', we might ask whether being paid to pray was like having a job and earning a wage. And was offering access to a relic more like a rentier role, drawing an income from owning an asset to be briefly loaned out? Or was 'praying' in someone else's stead more like 'farming', in the sense that the collecting of state taxes was 'farmed out' to tax collectors? A large monastery's agricultural lands were often 'farmed' to tenants and inter-mediate managers, a mode which could be assimilated to a familiar economic analysis, whether formulated in terms of feudal structures or emergent capitalism. But can the purchase of prayer itself be analysed like agricultural production or mining, as a matter of generating use-value, exchange-value, and surplus value, with the manufacturing of prayer as a profitable enterprise, even if the monks were actually selling a 'useless' product. After all, they would not have been the first or last in that category. What indeed counts as 'for use'?

That their 'product' was peculiar does not mean that the monks didn't actually work. They were often labouring, expending real material energy, in exchange for their payments in the form of direct donations or chartered gifts. Praying, as practised by a monastic community, could be a physically demanding activity, involving long uncomfortable hours, and a disciplined and dedicated commitment. To rise from a hard and presumably lonely bed in the early hours of a dark winter night and traipse through the chill cloisters to the chapel in order to intone the liturgical 'hours' before dawn was not an easy way to make a living – though there were, of course, even less appealing forms of employment at the time the monasteries flourished.

Even if we select that mode of praying which consisted of copying and illuminating sacred texts (while prayerfully meditating and 'chewing' them), it was not necessarily a joyous task to be cooped up in a cold carrel in a windy cloister during the freezing winter months, blowing on one's fingers to engender enough warmth to inscribe the next few laborious if sacred letters. As one manuscript colophon memorably asserts: 'Though it is only the finger and thumb that writes, it is the whole body that aches.' Seamus Heaney might imply that the pen is lighter than the spade, but perhaps not every monk (or peasant?) would have agreed. There were several senses in which a Benedictine motto might be interpreted: *laborare est orare* – to work is to pray, and vice-versa.

However, if we try to think of prayer as an activity paid for by a wage there are problems. What was the unit of labour? What was the appropriate rate of pay? What kind of expertise or skills were needed? Was, for example, John Kirkby later justified in demanding an increase in clerical salaries? Certainly, some evidence suggests a straightfoward fixed annual payment for praying, such as those made to Canterbury chantry priests

recorded in relation to the Acts of 1545 and 1547, which nationally abolished 2,374 chantries and guild chapels and seized their assets.

A manuscript in William Somner's hand details some specific stipends and duties for the chauntry priest for Eastbridge Hospital: 'To Sir Nicholas Champion chauntry priest there every year for his wages x^{li} vi^{s} $viii^{d}$' (£10. 6s. 8d). Or generally the several chantries in the Cathedral itself:

> First One Chauntry having in the same ii Preists called Prince Edwards Chauntrie, Also one Chauntry called Buckhingham Chauntry having in the same ii Preists, Also One Chauntry called Arundells Chauntry having to the same ii Preistes, Also a Chauntry called Brenchesleys Chauntry having to the same One Preist, Also there were three Preists perpetually to be founded to say Masses dayly by the Lord Cardynall Bewford, Also one masse daylie said founded by the Lorde Cardinall Bowlcher, Alsoe one Preist perpetually founded to say dayly masse for the Late Lord Warham Archbishopp of Canterbury.

The Black Prince's Chantry is listed in more detail:

> First, that the said Chauntry was founded in Christ-church in a place called the Undercrofte in the yeare of our Lord God MCCCLXII and with licence of his father King Edw. 3 he purchased lands, & agrement made with the Prior & Convent of Christ Ch. in Caunt. for the sustentation & stipend for 2 chapleins: the said Prince ordeined Sr. John Stewarde & Sr Nicolas de Lodington that they & their successors for ever to receive yearly forty marks above all charges of reparacons or otherwise of the said Prior & Convent.
>
> Also the said Prince Edward gave to the said Chapleines & to their successors for ever a house being in St Alphees parish, the yearly value of hit is $xx^{s,}$ whereof goeth out 4d yearly to be paid to St. Awstens, the reparacons at the proper costs alway of the Prior & Convent of Christch.
>
> . . it is plaine in the foundacon that they and their successors are bound dayly to say there divine service & other prayer there assigned, to the laud of God, to purchase grace & prosperous life to King Edw. the third, Prince Edw. & his wife & to pray for all christen soules; and after the decease of the founder, the King of England to be founder & to be prayed for in like manner.

Charles Cotton, editor of the manuscript (*The Canterbury Chantries and Hospitals, in 1546,* 1934) includes a somewhat caustic footnote (p. xiii) concerning Henry VIII:

> This prince himself left money in his will for his own soul and the souls of his parents to be prayed for that they might be freed from purgatory,

but he intended to steal the Chantry lands and dissolve the chantries so that all other souls might the rather be kept in that particular place.

The indefatigable scholar and ardent critic of mediaeval Catholicism, G. G. Coulton in his *Five Centuries of Religion*, volume 3, *Getting and Spending* (1936) has a useful chapter on various aspects of 'The Value of Masses'. He quotes a Premonstratensian Abbot, Philip de Harvenget, in 1160, on the moral problem raised by the whole system of Mass-fees.

> Judas . . sold his Lord for thirty pieces of silver; but our priests oftentimes immolate Christ on the altar for a penny – nay, for a half-penny, not considering that He would not that He should be sold at such a price, nor that the mystery of His passion should be celebrated with such intentions. He said "as often as ye do this, ye shall do it in commemoration of Me", that is, not "in commemoration of a penny", not "in commemoration of this world", not "in commemoration of any earthly comfort", but "in commemoration of Me", in order that ye may please and love Me.

The temptation to multiply masses in return for payment was seemingly irresistible, despite such criticisms and several attempts to eradicate the practice. Coulton points out that in 1244, the monks of Durham were pledged to an astonishing 7,332 masses a year, and he instances a quite small nunnery undertaking to celebrate 1,459 yearly masses. But in order to honour their statutory Mass-obligations monasteries would have had to increase the number of monks at a time when recruits were falling. Coulton claimed 'The number of Mass-contracts broken before the Reformation must have been enormous.'

The problem might be seen in the familiar terms of a business suffering a crisis of over-production and under-production. The English Benedictine Chapters had already resorted to tightening labour discipline and imposing work fines: the Canterbury province, in 1249, decreed that, 'lest the souls of defunct benefactors be deprived through omission and negligence of the Masses owed unto them', any priest-monk who passed more than three consecutive days without saying Mass should be punished. From one side, there was pressure to increase the production staff to meet pressing orders and standing obligations. In 1428, papal commissioners for the reform of Cluny, the greatest abbey in Europe, which had a complement of 80 monks, exhorted the abbot to raise the number of monks to something like its earlier complement of 150 or 200:

> in order that the sweet burden of Masses, lessons, ceremonies and divine service in general may be more delectably borne by a sufiicient multitude of Religious (a burden which, among few brethren, could be rendered heavy and wearisome and insupportable), and let the lord

> abbot pay strict attention to that horrible peril of eternal malediction which, according to Canon Law, impendeth upon all who diminish or weaken the number of Religious, wherefrom followeth the diminution and subtraction, from living and from dead, of their due suffrages.

They ordered the Abbot to reinstate some of the masses which had been discontinued, even without securing an increase in the workforce. A familiar form of 'productivity' drive.

On the other hand, there was the corresponding problem of deciding to turn down a potentially unviable or probably unprofitable contract. In an Appendix Coulton outlines the following Canterbury case:

> In 1368, Sir John Beauchamp, brother of the Earl of Warwick, bequeathed his manor of Easole to pay for a daily Mass to be said in perpetuity for his soul. It is evident, however, that the keep of a monk at Canterbury was reckoned at more than the income of this manor; for the Prior of Christ Church answered the Earl of Warwick as follows: "Most honoured Lord. We have received your letters, by which you have offered to give us the manor of Easole, after the will of our late much honoured friend Sir John de Beauchamp, your uncle, upon the condition, as you have written to us, that we shall be bound to assign and depute specially one of our monks to sing perpetual Masses, at the Altar of Our Lady in the Crypt, wearing vestments decorated with the arms of Warwick, for the souls of the said Sir John and of your ancestors.
>
> Hereupon, Sire, please to understand that, as we are aware, our loss cannot in any way purchase advantage for the aforesaid souls; understanding truly, that to bear and perform such a charge for so small a repayment, where there is scarcely any profit, would be too burdensome for us; wherefore, Sire, be pleased in this case to have us excused. And may God grant to you so to act that it may be to His praise and the solace of the aforesaid souls; and may he also confer upon you honour and good health for a long continuance."

A few years before, in 1362 when the Black Prince had founded a double Mass for his soul in the cathedral, the work was done by two secular priests who received board and lodging in the monastery, and £16. 6s. 8d. each in money. By 1365 Archbishop Sudbury was complaining: "It is difficult these days to find an honest priest who would burden himself with such continual residence and daily celebrations for a salary of £6. 13s. 4d." A case of wage inflation?

efficiency inspector

While records of the annual payments for formal chantry priests and overall figures for the extraordinary number of masses commissioned and

promised are relatively easy to find, the procedures involving more informal donations and requests for saying mass or other 'occasional' prayers, remain unclear. Could one discriminate between different forms of prayer, with varying rates of remuneration? Should one-off vicarious petitionary acts performed by an individual monk or priest be reimbursed according to the scope and scale of the specific request being made, whereas general worship commissioned from the assembled monks in choir was a more flexible commitment, a kind of job-lot community contribution?

We might differentiate between the respective 'terms of employment' of the cloistered monks and the clergy active in the cathedral or local parish, in so far as the 'working' clergy conducted public services as their normal form of praying while the monks mainly chanted the liturgical offices in the choir, though both were still in effect being paid to pray, albeit sometimes indirectly through ancient bequests. Perhaps 'private' prayer as simply an act of personal or individual spiritual discipline could be classified as an 'unpaid practice' or as dedicated 'vocational training', or simply 'work upon oneself', to use Wittgenstein's phrase.

One monetary distinction might be made on the basis of what the prayers were requested for. Reformation objections were often to any praying in relation to purgatory but it was sometimes still acceptable simply to 'pray for' the dead. An uncertainty about the legitimacy of such 'praying' can be traced through the revisions of the *Book of Common Prayer* and especially the Burial Service, but the Chantries Acts were a decisive repudiation of any specific paying for prayers for the purgatorial dead, precisely the basis upon which so much monastic wealth had originally been initiated, even if subsequently 'invested' in more orthodox economic activities.

Moreover, what the various prayer-full practices claimed to involve was a somehow non-material activity, comprising a 'spiritual' dimension, presumably rather difficult to assess for quality assurance purposes. If a hired efficiency expert or a time-and-motion engineer had descended upon the monastic choir stalls in the middle of the night, to check how far paying customers were getting their money's worth, how could they have judged the performance and productivity of the praying professionals? A sceptical inspector might observe one bleary-eyed monk drowsily muttering under his perhaps alcohol-laced breath, while a lusty companion bawled out a loudly enthusiastic and even suitably melodic verse, but how could one decide which was properly 'praying', and which to better effect?

Immediately prior to the final dissolution, a series of Visitations ordered by Thomas Cromwell reported on the state of the monasteries, mainly focussing on alleged moral turpitudes of various kinds. But could even a truly hostile inspector have simply reported that the entire core product of a monastery's corporate offering was wholly vacuous, a gesture without content, a practice without substance, an empty vessel, however conscientiously performed. As well as an accounting nightmare. What, after

all, was a 'fair price', a 'just' or even 'reasonable' remuneration for a hard day's praying? With overtime rates for early Matins?

We might add that if, indeed, the deity to whom these prayers were addressed did not after all even exist, or at least didn't operate in the way envisaged, if this endless round of acclamation and supplication were aimed at a non-entity, or at a merely Deist supreme being impersonally indifferent to such human cries and lamentations, what actually backed the coinage of this faith-full contract – and how to assess what the lay clients paying for, and what were the customers buying?

Yet upon this core transaction was built an entire stone edifice, the enormous cathedral itself, and beyond the monastic precincts an extensive network of landholdings, of barns and fields, of benefices and tithes, of sheep and imported wine, all of which would seem to make peculiar economic sense if the activity at the heart of it was premissed upon a mistake, an illusion, a delusion? But then, what is at the core of our own continuing belief in the exchange and accumulation of 'money' itself, or the elaborate institutions and practices of financial capitalism?

There is a novel by Magnus Mills (mischievously entitled *The Scheme For Full Employment*), in which the entire economy of a country revolves around an endlessly scurrying fleet of delivery vehicles which transport goods from one busy depot or trading station to another, thereby generating a wide range of ancillary services to keep the personnel of the haulage fleet fed, clothed, housed, etc., etc. Only for it to become eventually apparent to the reader that the 'goods' which the vans are carrying are only and entirely the component parts that have been disassembled from taking apart other such vans, and which will after delivery be re-assembled to make replacement vans which will then undertake to deliver elsewhere the parts dis-assembled from the vans which had delivered the parts which constituted them – and so on, in a multiple repeating loop. Is this almost as (un)believable a picture of a hollow but thriving economy as one partly built upon 'prayer'? Is Signor Carlo Pietro Giovanni Guglielmo Tebaldo Ponzi the most appropriate patron saint for such schemes, monastic and otherwise?

It was nevertheless, one must always acknowledge, certainly no illusion or empty delusion when Henry VIII's official expropriators confiscated several groaning cartloads of jewels, silver, and gold, from the expropriated shrine of Saint Thomas Becket. Or was Henry simply a successful version of Bernie Madoff, as the well-timed one who actually got away with the accumulated loot?

work upon oneself

Monastic prayer was not, of course, only an activity commissioned by generous donors or gullible pilgrims. For at least some of the monks themselves, praying was intended to be self-efficacious, even self-fulfilling, in the sense that its primary function was supposed to be their own spiritual improvement – an instance of what, to repeat the phrase, Ludwig

Wittgenstein (who had spent some time as a gardener in a monastery) characterised as 'work upon oneself', a theme explored in the intriguing study of Wittgenstein published under that title by the Dominican Friar Fergus Kerr. A devout individual monk could perhaps be regarded as praying, quite literally, on his own account. Perhaps more like an artist than an artisan? And the fact that large numbers of people were dedicated to such practices was once regarded as of overall benefit to the community at large. The Vice-Chancellor of my university was once rung by an irate local citizen, who complained that his new neighbour, a professor at the university, seemed to spend all his time sitting in a deck-chair in the garden, apparently being paid for doing nothing at all. In a response, sadly less likely these days, the VC replied: 'He's a professor of philosophy. Perhaps he's doing what he's paid to do - that is, to think.'

Marx, one might recall, had some difficulty with the notion of 'intellectual labour', however skilled and practised he might have been at it himself. How does one assess the exchange-value of Milton's *Paradise Lost*, as distinct from the market price of a printed copy of the published poem, or the advance specified in a publisher's commissioning contract? Can a 'labour theory of value' be deployed to calibrate a Shakespeare playscript, a Whistler painting, or even the increasingly impressive and expensive activities of a chess-playing Artifical Intelligence.

But is 'intellectual labour' the appropriate analogue for a monk murmuring matins in the midnight hour? In any case, while one may not consider the monks to have been engaged in a deliberately fraudulent or self-deceiving activity, and even if they sincerely and conscientiously believed in their own quasi-intellectual labour of praying, that activity may nevertheless have still rested upon a mistaken premise. We should perhaps distinguish again between the practice of vicarious petitionary prayer for which donors and clients most commonly paid directly, and the overall liturgical activity of divine worship to which the monastery was collectively dedicated, and which will concern us later when considering the choir.

professional services

Whatever its theological validity as 'work', should we instead think of the task of praying more as a commercial 'service', perhaps salaried rather than waged, alongside other professional services for which people were prepared to pay, because as clients they believed in the utility or value of a hired expertise even if that belief was in some sense misplaced. After all, we still speak of the clergy as holding 'services' in a somewhat ambiguous sense of the word. We could see a 'services' transaction as one in which the the monks were hired to perform a paid-for activity which benefits the clients, specifically by allowing them not to have to do the work of praying themselves, much as one might hire not only a plumber to install a tap but rather more up-market intermediaries to do some work rather than do it

oneself. Some appropriate models, offering multi-layered professional services, could be an estate agent, a mortgage broker, perhaps a financial adviser recommending property investment opportunities, a solicitor hiring a barrister on your behalf and for your benefit, and so on, perhaps all employed in order to assist in purchasing a house. Securing one's bijou mansion in heaven might be well worth the professional prayer fees, even if multiplied and increased at several levels of the chain or hierarchy of specialist service-providers.

After all, what if through some such network of intermediaries, including enrolling impressive figures of saints and martyrs to act on your behalf, you were potentially being offered the possibility of an actual miracle in exchange for your financial contribution? The miracles brought about by Becket were an 'answer' to prayer of an impressively spectacular kind. A successful appeal to or through Becket himself might be a much more effective and profitable version of any mere amateur submission by oneself, addressed personally but stutteringly to the awesome majesty of the divine. Between such extreme ends of a scale of suppliants as oneself and Saint Thomas, there might at least be some affordable holy priest or adequately devout monk, while regular payments might most efficiently be directed towards a collective service provider, whereby one could activate supportive prayers from an entire monastic community, enlisting a whole team, almost a spiritual Goldman Sachs. The miracle windows partly acted as illuminated bill-boards advertising Thomas Becket's premier miracle service, conveniently if not exclusively available through the cathedral's own dedicated monks. They even promised a better class of holy water.

We might here imagine installing an additional 'financial window' to go alongside the other windows series, which could illustrate an impressive range of 'services' potentially available. Ideally, if monastic praying was truly efficacious such an advertising window might even bear a persuasive resemblance to a celebration and imitation of Christ's own repertoire of miracles, as recounted in the New Testament. His personal provision of highly desirable services was indeed impressive. Who would not want to enlist the aid of someone capable of offering catches of local fish to order, supplying medical cures without waiting lists, instant free multiplication of food orders, and the provision of excellent wine at attractively reduced prices, no more expensive than water. Christ's own provision of useful social services was of course exceptional, well beyond the range of any except the highest Saints who could strive most to imitate and emulate him.

Somewhat less ambitiously, ordinary monkish praying could be compared to the more mundane services of, say, a versatile medical practitioner, despite such odd aspects as how to assess the quality of the prayer prescription involved, or agreeing an appropriate retainer rate. Could there be a contracted payment by results, even if the final or ultimate (posthumous) 'result' was not itself verifiable, and where one might not even be able to assess the end-value of the service until you had eventually

joined the Saints yourself in heaven. Which might indeed take a miracle. And if it proved, after all, an ineffectively empty practice, how would one really know that it hadn't worked, at least in time to demand a refund?

Which is partly why widely recognised Saints had a reassuring role as intermediaries and providers of secondary intercession, including sub-contracted access to a complex hierarchy of contacts and mediators within the overall 'communion of saints'. By appealing to your local or parish saint you might hope for a more favourable immediate response, but recruiting a better level of praying from a specialised category of saint might ensure a more reliable result, while calling upon the appropriate designated patron saint of, say, dentistry or lost objects, even of 'impossible causes' (Saint Jude's speciality), was worth some prior market research. Approaching Christ himself through his mother was always a recommended strategy and general short-cut, though in one of her apparitions she was known to have complained about being already over-worked.

One could always try individually to ascend the lobbying hierarchy, from local titular parish patron to renowned miracle-worker, from dropping in to the village church to say a prayer to undertaking a pilgrimage to the local cathedral or even journeying to Jerusalem. But enlisting an entire monastic community was surely more efficient, putting into play a whole back-office as it were, so that the credibility of the operation did not rest upon an individual practitioner but upon the kudos and stability of the Corporation or approved Order for which they worked, and not just the current monks praying for you but the ancient saints whose relics were available for your benefit and even included the numerous generations of dead monks in the monastery's own cemetery. The widely known lives of saints, recounting their specific repertoires of miracles, could even provide a kind of checkable credit agency or performance table.

After all, the New Testament itself advocated laying one's treasure in heaven where it would not rust, and access to it surely came through the proper channels, invoking another sense of the term 'treasury' itself: that the church, in its departed saints, had a store of 'merit', of accumulated 'grace', which could be literally called upon, much as a bank might draw upon its reserves of cash.

The heavenly treasury was a store-house of accumulated spiritual deposits which could, for a suitable consideration, be shared amongst the deserving living. The customer could thereby have 'grace' 'imputed' to them, a concept to be considered shortly, which eventually linked Luther (on being 'justified' or saved) to the Hungarian Marxist Georg Lukacs (proposing the possibility of 'imputed' class consciousness). Having one's account credited with almost an unearned income from the rich store of God's own grace acknowledged that his son's very life and death was the truly authentic gold standard.

To return, however, to the more pragmatic level: what was the actual cost of a basic service, especially that of saying a mass. Was the price of a mass the same as how much a mass was worth, the perennial problem of economic calculation and financial negotiation? In practice, was the transaction price for 'prayer', in its various forms, arrived at by an established or negotiable market-value? Was it simply the lowest rate one could get away with offering, or, from the viewpoint of the monk or priest, the highest one could competitively charge? Certainly, parishioners probably knew more or less how much they were expected to offer locally. But could there even be a coherent correlation between what was paid and the service provided, using some justifiable scale? Or is that an irrelevant consideration, an inappropriate model?

Again, if a quality control inspector were to visit a monastery (it was often the function of the local bishop to act as Visitor, to conduct a formal 'Visitation' of ecclesiastical oversight) was it possible to assess the quality and scope of the product on offer? Could there have been a look-up table, as when comparing hospitals or even individual surgeons in a private health system run for profit? Or was there some overall notion of an enforceable fair price? If a monk had been paid directly or indirectly to say mass or to offer prayers on behalf of a named deceased person, could he also include a few additional names and legitimately incorporate those extra customers into his prayerful intentions? Or was this an invalid form of leverage?

A single one-off Mass could certainly be said in memory of a flexible list of those commemorated in any particular celebration, but should those who had paid more get some kind of notional or intended priority? There were several more theoretical conundra, not least to do with accounting for a potentially infinite return (the entirety of eternity might be at stake) or the curious multiplier-effect of intention: what if a mass or prayer were explicitly offered up not for an individual, or a specified number, but intentionally for 'all mankind'? Did this diminish the impact upon a designated purgatoree? Did adding more potential beneficiaries reduce or increase the price? Could supply adjust to fluctuating demand?

According to Canon Law it was at least necessary that the priest who celebrated a Mass should be properly ordained and authorised, and according to Catholic doctrine it was then irrelevant to the efficacy of the sacrament whether the priest was personally holy or otherwise. But did this also apply to an individual contract for some specified but non-sacramental praying? Could one legitimately complain if a monk specifically assigned to pray on one's behalf turned out to be regularly forgetful, an habitual drunkard, or otherwise disreputable, whereas the monk assigned to implementing one's neighbour's request was acclaimed for his piety and sanctity? If the praying monk were distracted by thoughts of breakfast or by

a particularly intriguing textual problem in the manuscript he would later be copying in the cloister, should he be contractually obliged to start his prayer over again from the beginning? Could the implementation of the stipulation in a bequest, that a specific number of Masses should be celebrated in return for a fixed annual donation, be adjusted in a period of monetary inflation by reducing, or increasing, the overall number of required Masses? And what was supposed to happen when a mass was contracted to be performed perpetually on behalf of a named donor 'and his descendants' when no member of the family was known to be recently deceased? Was there an expiry date ?

These are not entirely fanciful questions, or even simply irreverent. I am confident that in the acres of casuistical treatises and commentaries on Canon Law all these knotty matters will have been meticulously discussed. The last issue, for example, was explicitly raised and debated during the dissolution of the monasteries in the 1540s in order to invalidate legal claims that there should be retrospective recompense paid by the Crown to the successors and heirs of any original patrons of or donors to the monasteries which were now being dissolved.

The commentaries on what are now Canons 879ff still make interesting reading. They don't however resolve the question of how paying for prayer, or making donations towards a possible Becketian miracle, or handing over a fee to kiss a relic, or donating land in exchange for perpetual prayer, can most appropriately be interpreted in terms of any cogent economic theory.

But is this because when faced with the peculiarities of paid prayer, economic theory itself has problems which are not confined to the idiosyncratic issue of prayer itself? For a start, what is an economic theory anyway?

*

currency exchange

However, before exploring the notion of 'economic theory', there is another possible way of approaching the notion of paid prayer. Praying as a commercial 'service' might be regarded, analogically, as basically providing a form of currency exchange, a practice perfectly familiar to those reckoning up the donations of multi-national pilgrims, as the accounting reference quoted earlier to foreign coins indicates. Jesus's deployment of a coin inscribed with the name of Caesar would also have been familiar.

On this model, the donor or customer handed over hard cash, land, jewels, gold, etc., in exchange for which a monk converted that terrestrial contribution into the 'foreign currency' of heaven itself, since prayers were the prime activity of heaven's own inhabitants. It might even be part of the clerical service to translate one's vernacular and amateur petition into the sacred language itself, that of church Latin.

Those transmuted prayers could then 'pay' for the actual services desired, including any bonus intervention involving the celestial prayers of some

well-endowed saint recruited as an additional intermediary. That enhanced assistance may then operate at an even higher level of spiritual currency, that of 'grace', which, in favourable circumstances, might eventually be translated directly back into the local earthly categories of wealth, such as an increased personal fortune, a successful business transaction, a ship coming home safely, or a lucrative marriage, duly occurring as the result of appropriate prayers in the correct medium of heavenly exchange. A circulation of 'grace' sustained a beneficial cycle of currency transactions and translations, a circuit of meritorious exchanges between the terrestrial and the celestial terrains.

As with all foreign currency transactions, of course, there may be hidden charges and complications, fees and commissions, so entrusting such matters to a professional is always a wise precaution. Though on a Calvinist theory you may already be predestinately fortunate, needing no intermediaries, with your future already secured by an eternal trust, an impregnable inheritance of imputed merit. Even for a Catholic, a successful Earth-to-Heaven currency negotiation could take the solid form of a permanent endowment, ensuring participation in a fund that pays out perpetual interest or dividends, since if you could assemble enough earthly donations to establish and endow an entire monastery, then your chosen prayer foundation could in perpetuity apply some of its heavenly treasury according to your specifications, even offering a founder's bonus.

In some privileged locations, such as Rome or Canterbury, no actual new praying might even be needed, since the accumulated merits of your local heavenly bank branch might already be sufficient to supply the continuing divine currency in the quantities demanded. Favourably inclined saints could deploy their valuable local relics as collateral, sureties, or deposits already available in the vaults of your preferred one-stop shop. The Communion of Saints provided a collective treasury, an overall holding company, in which you could take out shares, especially if you qualified as saintly enough yourself to be a credible investor. Mediaeval Canterbury was a major player in such dealings, if not quite on the scale of the main Vatican clearing house, but competently able to deal with multiple rights issues, whether in the name of Dunstan, Aelphege, or Becket.

Of course, within limits, you could try to enact such heavenly currency transactions yourself, even doing your own praying and personally soliciting influential saintly backers or intercessors. One might compare today's smart-phone on-line banking apps, enabling immediate etherial person-to-person transfers and instant speculative FX dealings. Indeed the nature of the currency involved is such that you could almost in effect mint a certain amount of your very own notes or coins, by simply improvising personal prayers and managing your own self-employed account.

But not all of us have the time, competence, or credit-rating, to do so in a suitably efficient manner, and there is always a degree of uncertainty in such independent operations. Will one's individually minted prayers be fully

acceptable, or rejected like an unrecognised crypto-coin? Will they still require boosting by favourable saintly references and endorsements, or be guaranteed sympathetic support from prominent saintly brokers? Will busy popular saints listen to an amateur application or self-composed plea, or even hear their hallowed name being hopefully intoned in the insistent anarchic clamour of the liturgical market-place?

Surely the sensible option is to pay a practised professional to pray in the preferred traditional modes and correct formats, with all due rituals and an expert concentration of validated resources, so as to maximise the eventual benefit. Given that the heavenly value of effective professional prayer might vastly outweigh the mere earthly application of one's meagre cash resources, the overall return on a recognised praying investment could be highly attractive, even infinitely so. Almost a variation on providing cash for celestial honours. Particularly at dying bedsides, monks were renowned as persistent and persuasive spiritual sales reps, the top-notch travel insurance agents of their day, instantly providing the proper currency even for unexpected last-minute journeys.

One of the more financially relevant biblical passages casts a side-light on this way of possibly thinking of prayer as currency exchange. The eviction of the 'money-lenders' from the temple is sometimes regarded as some kind of unfortunate slight upon the necessary activities of those whose disagreeable job it is to deal with the filthy lucre of gold and cash – as if Jesus himself had some fundamental objection to financial transactions and profit.

But what is overlooked is that such Temple 'money-lenders' were actually 'money-changers', a necessity of the Temple regulations: tribute had to be paid not in the ordinary currency of everyday market business but in the special coinage of the old regime, and the only way to obtain such coins was to deal with the official money exchangers. They were not so much lending money as offering the necessary and required service of temporarily converting ordinary coins into temple coins. Jesus may have expelled them from the Temple precincts, for whatever obscure reason, but they would then have promptly needed to relocate somewhere nearby to continue their essential service, as would the approved temple merchants who provided the strictly specified and regulated sacrificial offerings, doves, pigeons, and the like. Without them the temple's whole business would be endangered, with bankruptcy looming, the entire enterprise in danger of being destroyed, and once a financial system collapses it is difficult to revive the necessary institutions. Certainly not in a few days of crisis management.

In Bombay/Mumbai, just near the Gate of India, there used to be a popular shrine reached by walking to the end of a long causeway, stretching out into the waves. The entire length of the walk-way was flanked by scores or even, at peak visiting times, hundreds of squatting beggars, each expecting a donation. The only sensible way to arrive at the shrine with due regard both to required charity and to one's own financial survival was to

make the tiniest donation possible to each individual beggar. This involved finding the very smallest coin of the realm. Which were duly provided by the money-changers at the start of the causeway, who exchanged a single rupee for several hundred tiny coins, each of which could be handed to an outstretched palm. And at the end of the day the professional beggars would line up at the same money-changing stalls and convert their accumulated pile of tiny coins into proper rupees which could then be spent in the local market or elsewhere. The very same minimal denomination coins would physically circulate the next day, and probably eternally, on the causeway, even after the legal value of those miniscule coins had long vanished. An effective dual economy, a circulation of hard cash and charitable merit.

So, if you wish to travel and trade in the realms of heavenly reward you really should acquire the most acceptable currency, and your local monastery will be happy to offer that divine provision. Though of course the time will come when spiritual entrepreneurs may abandon the traditional monastic standards and seek to make their own personal arrangements. As with corner temple Hindu practices, this may even result in a somewhat bewildering proliferation of idiosyncratic personal rituals and obsessively individualised prayer performances, not all of them as elegantly formulated as, say, Lancelot Andrews's *Preces Privatae* but rather more like the paranoid obsessive behaviours of Bunyan's *Grace Abounding* or James Hogg's *Confessions of a Justified Sinner*.

As the middling ages waned, various supplementary variations of personalised prayer rituals came increasingly onto the commercial market: the nicely decorated 'book of hours' as one's very own domestic version of the monastic currency handbook and manual, and the rosary as a form of partly automated prayer-wheel, or later the 'book of common prayers' or John Day's *Book of Christian Prayers* as a kind of basic home production kit. But compared with the splendour of a year-long community chant by scores of intoning monks, these new modes could seem only a pale imitation of the true gold coinage, perhaps merely like a scribbled personal cheque or just a plastic token. The danger was, of course, a complete collapse in inter-dimensional currency values.

A related comparison might be the use of virtual money or purchase tokens in an online game and its ostensible IRL value ('in real life'), or indeed the increased issuing of state welfare relief only in the niggardly and ungracious form of supermarket tokens, or with gig-economy 'wages' paid as sales vouchers for use only in approved company stores.

One might here consider also the problem of historically incommensurate currency exchanges, another aspect of the problematic character of economic history and theory. We might hazard some sort of estimate as to how much a mediaeval cow would cost today, or the 12th century purchase price of a rental property in today's Canterbury estate agent's window. But such calculations would not be reliable, not simply because of the changes

in relative values across a large historical gap, as in trying to estimate the wealth of a monastery from its 12th-century sacrist's accounts. It's not simply a matter of finding an updated rate or scale in monetary terms, or even taking into account estimated inflation or consulting a 'cost of living' index.

Asking what a mediaeval cow might be worth in today's terms must obviously be referred to a particular location and an entire prevailing economic system and it is highly unlikely you would buy a cow or two to keep in your English suburban back garden today, while an iPhone transported to twelfth-century Canterbury would be almost entirely worthless, except perhaps, like vestments, for extricating rare metals. Even reckoning the daily cost of maintaining Canterbury Cathedral today is in various ways wholly incommensurate with any estimated cost of originally building and rebuilding it.

Yet the very size of the present building indicates that, on any account, the wealth generated by donations and payments for professional prayer was once enormous. Though the practice has survived in the rather diluted form of paying Anglican clergy to be clergymen, the financial transaction at the core of so much specifically monastic income was finally, and logically, forbidden and legally eradicated in the Chantries Act of the first year of Edward VI. Unless the donor had been Henry IV or VIII, it was no longer legitimate to pay someone to staff a chapel dedicated to the hard labour of praying for the dead.

indulgences

One of the main objections to monkish and Roman practices which came to a head in Henry VIII's time concerned the profitable business of 'indulgences'. The issuing of indulgences was an interesting innovation in the repertoire of the paid prayer economy. The printed indulgence was perhaps as near as you could get to inflation-proof paper money, and it involved minimal production outlay beyond the costs of paper as raw material and administering the licence system, since the franchise to hawk indulgences by travelling ecclesiastical peddlars or 'pardoners' could itself be a source of papal and episcopal income. There had always been a certain arbitrariness about the calculated relation between an offering and the prayer-load for which it paid. Again, how much was a Mass worth? How much for a perpetual chantry? If there were no calculable unit of prayer, how could one possibly make a rational investment? The new technology of standard-issue Indulgences provided a reliable metric, an explicit measure, a written contract, especially in the printed versions.

An applicable unit of account was to hand in the calculation of one's obligation as a feudal tenant in terms of work-days, required time working on the Lord's demesne. Or in the practice of imprisonment for a specified number of days. A related unit was available in that counterpart to prison

and prayer: the imposition of a penance. Consider the earliest Anglo-Saxon penitentials, for example that of Theodore of Canterbury, which designated and tabulated the penalties to be applied for committing a diverse range of sins, closely similar to the tariffs specified for criminal offences in the secular laws. When seeking the favour of the Almighty, especially through the confessional, an acceptable alternative to praying might be time 'doing penance', though a stipulated 'penance' may often have been simply 'doing time' in praying. (Again one wonders at the applicable criteria any efficiency inspectors could deploy.)

There might be a rough temporal equivalence between a few punishment hours spent in the secular stocks and the recitation of several dozen penitential Hail Marys, or perhaps a kind of parity between a lengthy and arduous pilgrimage to the Holy Land, and a lifetime spent in prison, or as an anchorite in isolated meditation. Or a weekly prescription of hair-shirted prostration before the parish congregation might be more or less equitably converted into reciting the long version of the litany of the saints several times over. The forty days of Lent could themelves be regarded as a kind of annual communal open prison of penitential observance. These various miscellaneous correlations could, in effect, be rationalised by 'indulgences' as explicitly specified and with fairly uniform variations, like trans-national currency exchange rates universally measured in 'days', terrestrial or notional. A tourist five-day pass in Venice is a remote descendant.

The problem of how to calculate some correlation between price and benefit was central to the developing doctrine of purgatory. As sketched earlier, the number of 'days' of penance or purgatorial suffering could be calibrated in relation to the enumerated activities of prayer or piety undertaken to gain forgiveness or mitigation, for oneself or others. There was almost a fixed ratio: if a particular sin drew upon itself a specific number of days of earthly penance, as a crime might result in a designated term of imprisonment, so the (incalculable) days of posthumous purgatorial punishment might also be given some defined notional exchange-value here and now, however spurious.

Such transactions eventually generated what one might regard as the 'paper money' of prayer which provided almost an automation or algorithm whereby so many days of earth-bound penance or prayer might be seen as being pre-payment for post-death dividends, by earning remission from one's assigned 'days' to be spent in Purgatory, though to benefit from such a reduction one had to have at least made it into purgatory in the first place. It was surely worth a gamble, a financial flutter, and the purchased indulgence was effectively among the first printed forms of gambling token or casino chit. One or two survive in the Canterbury cathedral library, with a blank line still waiting for a name to be filled in. Any offers? An accumulated thousand years, do I hear? Cash only, no VAT? As ever, the cathedral urgently needs the money.

Over and above these several quasi-'economic' readings of paid praying, a more general analogue might be with several aspects of the overall modern financial system itself, not least as an institutionalised gambling game. It was perhaps a small step from indulgences to bearer bonds, or vice-versa. Some might also see the printing of millions of indulgences, whatever their alleged face-value, as a precursor of central banks printing money at will, or a quantitative easing programme which conjures unimaginable sums from a notional but effective fiat currency created *ex nihilo* in a manner almost as elusive as the big bang itself, defying the previously accepted rules of economics as the earliest cosmological event escapes the laws of physics.

Nowadays, a very few of us can, if appropriately authorised, merely inscribe a number or a well-placed zero on a piece of paper to multiply dollars, without much more effort than a pardoner scribbling increased days and years for a special client. We all have the notional ability to write a personal cheque for several millions, though admittedly somewhat ineffectively unless already having a corresponding sum in one's personal account, or a very generous credit rating. Uttering a quick prayer to gain an authorised 'plenary indulgence' was similarly possible, though perhaps with even less effectivity in the long run.

As with many financial innovations, however the competition between available products could result in somewhat arbitrary levels of incentive. If it needed a decent cash donation to ensure an ongoing Mass for one's dead, how much was twenty 'years' in (or rather not in) Purgatory worth? If it took a whole monastic choir a week or two of dedicated chanting to stack up enough prayer power to (hopefully) guarantee a favourable battle outcome or lucrative dynastic marriage, what did the prospective customer of these new-fangled product lines have to do to 'earn' a few thousand years of purgatorial remission? Was the required effort akin to the Old Testament precedent of having to keep one's arms painfully raised in order to win a battle. Or merely involved a pleasant stroll to the nearest properly designated chapel.

Since one impetus for the proliferation of indulgences, especially the portable printed kind, widely available for hard cash, was to finance the rebuilding of Saint Peter's church in Rome (a major conversion of prayer into stone), the primary selling strategy was to offer increasingly attractive and unprecedented incentives and rates of return, which inevitably led to a certain inflationary spiral and a radical lowering of the average requested donation. Instead of traipsing to Jerusalem or even Canterbury, it became possible to swap a visit to a named local church on a specified date for, say, two hundred years of penance avoidance, a kind of neighbourhood cash machine under the aegis of a patron Saint often given a starring role in the parochial brochure or painted walls and windows. To tramp at great expense to Compostella may once have been a profitable penance, but soon

perhaps a shade old-fashioned, yesterday's financial offering. Now, merely to saunter round and kiss the seven side-altars in a nicely accessible local church dedicated to some Saint Ignotus might be a much more amenable and cutting-edge undertaking for an impressively inflated return, and even locally available as repeated savings deposits. Canterbury Cathedral had its own specified indulgences, an additional incentive to pilgrims not necessarily confident of a personal miracle or a special offer delivered by Becket himself.

An extant exchange of letters between Rome and Canterbury concerning the precise divvying up of the expected proceeds from the (as it turned out) last and never properly celebrated major anniversary of Becket's shrine in 1520 make interesting reading. Rome demanded not only a considerable cut (much more than an arm and a leg) and also insisted on licensing the whole operation, with Canterbury being disdainfully treated as merely a local franchise outlet.

Though where precisely all this newly-minted indulgence merit derived from was, admittedly, a trifle obscure. Was the accumulated treasury of the saints not only an invisible but an inexhaustible asset? Was there some danger of an unsustainable run on the Vatican grace bank? Or could the papacy simply print its own brand of eternally convertible currency? What if Purgatory itself were depleted by all this speculative fervour, running out of days to be served as absolutely everyone simply cashed in and bought advance exemptions? Could Purgatory become redundant? And, personally speaking, could I piously build up sufficient present credit to off-set all future indulgences of quite another earthly kind by applying for a so-called 'plenary' indulgence? As with all such insurance and pension-provision novelties, old questions modulated into newly anxious inquiries, from both sides: have we over-sold the product, discrediting the safe old ways in the process, and should I really risk a flutter on an unproven offer? The bubble was liable to burst. Though Pascal was still pondering the gambling odds on after-life investment long after papal indulgences had been widely discounted on the faith market.

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critique of monastic economy

Monasteries had frequently been targets for criticism, long before the Reformation, with accusations of monks violating their vows, particularly that of chastity, and disputes concerning alleged fraudulent practices such as forged charters, financial expropriations, administrative incompetence, and so on. What was implicit in the general Reformation position and activated in the local Henrican policy of total dissolution was a repudiation of the entire monastic system, no longer an attack based upon individual failings to live up to acknowledged standards and worthy practices but a rejection

of those practices themselves, targetting not merely scandals or excesses but the core activity itself.

There is a parallel with the 19th-century development of a systematic critique of the entire economic structure of manufacturing capitalism, involving not simply specific accusations of local exploitation, excessive hours, scandalously low wages, appalling working conditions, child labour, and so on, but a critique of the alleged core activity of capitalism itself, seen as constructed upon a systemically unequal relation between capitalist and worker. In particular, Karl Marx, partly developing an Aristotelian distinction between use and exchange, argued that 'labour power' had the specific characteristic that its 'use-value' was to create 'exchange-value', but that labour was systematically paid less than the 'surplus-value' it thereby created, a theory which in his view both explained the systemic economic inequality and indicated a crucial agent of possible resistance and eventual transformation of the capitalist sytem.

We can now retrace our steps in less flippant mode and try to understand how monks being paid to pray on behalf of clients or patrons was not only a successful economic enterprise but may also shed some light on the later 'success' of 'capitalism' itself.

To recap briefly on why the issue is problematic: at various times perhaps one in 50 of the English male population was a cleric, monk, or friar, with between 8,000 and 17,000 religious personnel at different periods owning or controlling a considerable portion of the total land acreage and the accumulated national wealth, with a combined income of the 850 monasteries in the early 16th century considerably greater than that of the monarch. Much of the monastic fortune derived directly or indirectly from donations or assets exchanged for what might now be regarded as fictitious or even imaginary services. In its various forms, payment for 'prayer' has no coherent price-tag, lacks any cogent unit of exchange, operates with no plausible quality assessment criteria, and so on. Yet in return for a partly indefinable activity, the monks accumulated tangible worldly goods and possessions.

The notion of 'grace' as somehow mediating between the divine economy and the earthly treasury may have been opaque, but the acquisitions of the monastic communities provided palpable evidence that the system 'worked' financially, at least for the monks. Part of that wealth was generated from what would now be widely regarded as a deluded belief in the efficacy of relics and the possibility of miracles. In addition, by 1540 possibly a third of overall monastic income was derived from parochial benefices, tradeable assets which were sold after the dissolution as lay 'impropriations', alongside such more obviously material goods as land, livestock, and buildings.

Yet the activity of prayer, however well paid, made no direct contribution to the agricultural or other forms of material production controlled by the monasteries. Moreover, the fact of being a monk had also meant being

situated in and indeed constituting one of the more prestigious and privileged if not directly powerful social positions within the overall structure of social relations. What sort of 'economic theory' can explain the role of prayer in that overall system? If notions of prayer as wage labour or salaried services seem unsatisfactory, is that because of an inappropriate application, or because of problems concerning the model of 'economics' being invoked? Is it an adequate analysis simply to acknowledge that some people paid for a service they believed in?

'economic theory'

Let us therefore consider the very notion of an 'economic theory'. It is sometimes assumed that any 'theory' has to postulate a rational construction, a systematic conceptual structure, on the model of a theory in physics. But there are lurking problems in relation to any systematic thinking about economics, as indicated by, for example, Witold Kula in his *An Economic Theory of the Feudal System.*

Kula suggests that what often counts as a modern mathematical 'economic theory' is an attempt to construct a model which implicitly assumes 'rational' behaviours by economic agents, and tends to attribute 'rational' motivations, which in turn are supposed to be based upon calculable monetary considerations. And since money prices are then regarded as the only numerically measurable basis for commensurate calculation of both inputs and outputs in an economic exchange system, and which therefore can be postulated as the only consistent basis for rational decision-making and activity, such calculations must be central to any rational economic system, and thence at the core of any consistent and coherent 'theory' of such a system. Even if, as it can sometimes seem, the economic system is not itself self-evidently rational.

As Kula's account indicates, any 'theory' such as he describes is in effect circular, with a restrictive notion of what constitutes 'rational' motivation and action. Anything other than an underlying 'price calculation model' is regarded as not 'rational' and therefore inappropriate to figure in a properly systematic 'theory'. Yet obviously, as he emphasises, not all economic decisions depend upon such strict 'price' calculations. He instances a farmer preferring to retain six low-yielding cows rather than exchange them for three cheaper and more profitable thoroughbreds, because having six cows will allow him to provide marriage dowries for his three daughters and still have three cows for himself. A more modern instance involves a farmer buying a tractor not because of any demonstrable efficiency but because of the high prestige of simply owning a tractor in a local agricultural community.

More broadly, for Kula any 'systematic theory' of social regulation and economic reproduction which disregards the changing narratives of local beliefs and historical practices can lead to problems of false periodisation or

a mis-recognition of significant social transformations. For example, approaches to farming and landholding in some parts of early modern Poland changed from an emphasis upon possessing increased land area to one favouring productivity, so that instead of ardently pursuing escaping serfs, as previously, landowners switched to evicting now-superfluous numbers of serfs. Instead of calculating returns on the basis of the absolute size of the harvest a farmer might learn to prioritise future market prices, while another instead of resigning himself to a slow economic decline might simply choose a premature but honourable retirement or even bankruptcy. For Kula an 'economic theory' without a detailed social history can be abstractly schematic rather than richly explanatory.

A related instance would be the economic policies of the International Monetary Fund in recent decades. One of the working premises of the IMF's standard 'structural adjustment programmes' was effectively that when given the chance any recipient of an IMF loan will choose to become a competitive businessman or entrepreneur, a profit-producer seeking to realise a surplus primarily for themselves rather than as a contribution to a collective community. John Mihevc in his study of the World Bank, *The Market Tells Them So* (1995), instances a range of studies by sociologists and anthropologists commissioned to understand 'peasant consciousness' in 'developing' societies in order to comprehend the obstacles that 'prevented' traditionally-minded peasants from becoming self-interested surplus producers. Even if they didn't want to. Mihevc characterises the attitude of the IMF as a form of 'economic fundamentalism', a version of almost religious belief in a particular economic theory and assumptions of motivation. At the end of the 1670 edition of his *Credulity* treatise, Meric Casaubon recounted the familiar tale of American natives exchanging gold for cheap trinkets brought by European traders. What if overall economic activity in a particular society is actually shaped by pervasive 'credulity', even a form of delusion, mixed with deliberate misinformation and imposed obfuscation.

Moreover, if a theory of an economic system is offered as a set of quasi-equations connecting dependent and independent variables, then such a theory should be able to explain the internal reasons for any collapse of the system, and also indicate how unexpected external factors could impinge upon those equations, such as a blockade on exports or a virus outbreak affecting production. An analysis of an economy may deliberately offer only a 'neutral' descriptive account of apparent correlations in recorded data, but may also attempt an explanatory construction of cause-and-effect, and perhaps then propose prescriptive or normative conclusions, directed at economic policy decisions or political objectives. Conversely, a major change in an economy may arguably stem primarily from political or other ideological considerations, with traceable consequences and recordable effects.

One might be tempted to suppose that there simply cannot be a coherent 'economic theory' involving paid prayer as a major factor in the overall late-mediaeval English economy because such praying is not a rational act, or susceptable of reliable calculation, even if it was so regarded at the time. And therefore one would assume that the operative factors in the 'collapse' of the monastic system were primarily 'religious', political and ideological, not least the contentious 'external' role of the papacy or Henry's pressing need for financing international war aims.

Nevertheless, the rapid eradication of such a prominent but apparently anomalous component of the later mediaeval economy suggests that thinking about prayer in terms of 'economic' as well as 'religious' explanations might at least prompt considerations about our own economic context, even if paying for 'prayer' is (one assumes) no longer a widespread business practice in the capitalist system which decisively emerged, in some versions, at more or less the moment of the monastic dissolution. Admittedly, US tele-evangelists still find being paid for prayer highly profitable, as do such niche entrepreneurs as the 'narco-pentecostals' of Rio de Janeiro.

Aristotle

An up-to-date mediaeval scholastic would at this point have consulted Aristotle. There are two passages in Aristotle's writings which have been claimed as the originating sources for most subsequent attempts at 'economic theory'. One argument is particularly applicable to thinking about the monastic economy. Aristotle commented upon what in Greek is literally '*oikonomia*': the management or governing of a house (*oikos*), or what we might call 'household economy' or even domestic economy. What he had in mind was an estate which comprised both the 'house' in which a family lived, including any extended 'family' of servants and workers, and the lands which provided most of the household's food and other necessities. A well-managed household in Aristotle's view was characterised by an adequate sufficiency, able to meet its normal requirements for a 'satisfactory' mode of life. Characteristically, Aristotle saw this ideal in terms of a sustainable balance between having too little and too much, a limited mean (*satis* in Latin translation). The household estate ideally provided whatever was useful to meet the normal needs of the household. Any product over and above those needs was in a sense use-less, had no usefulness not already provided for. Within the household economy there was no 'exchange' but a distribution or allocation, as with the monastic treasurer organising the overall provision for the community through intermediary officials with particular responsibilities.

If the Aristotelian estate produced more than its own needs, for example due to a unexpectedly bountiful harvest, the surplus might simply be shared with friends and neighbours. But that excess produce could also be taken to

a market and exchanged or sold. In which case a different set of considerations came into play for Aristotle, precisely those which now govern our current conception of an 'economy' and where Aristotle's main contribution to future 'economic thinking' is often found.

With regard to market transactions, as a way of disposing of the internally use-less household surplus, Aristotle distinguished, in his usual analytical approach, between four possible procedures for the exchange of any product, which were later to be formalised in a familiar terminology and standard shorthand. If the surplus product was directly exchanged for some other product of use to the household which was available in the market this was a simple barter exchange, summarised as C – C' : one 'commodity' exchanged for a different commodity, using the modern term commodity to indicate any item available in or brought to the market. The exchanged item would now have some expected use, or useful-ness, for the purchaser, its new user.

A different procedure would take place if a commodity was exchanged for money and that money was subsequently used to purchase another commodity. The relevant shorthand here would be: C – M – C', with M standing for money operating as a medium of exchange and also as a temporary store of value which could be activated at some later time when a desired commodity became available to be bought. A variation of this process was characterised instead by the formula M – C – M', which designated a sequence in which money is used to purchase a commodity which is then sold for a larger sum of money, thus generating a financial surplus or monetary profit on the overall exchange. Crucially, this procedure might then be repeated, with the additional money being itself deployed to buy another commodity which again could be sold to generate a further additional monetary gain: M – C – M' – C' – M" and so on, a sequence which could in principle be repeated indefinitely.

Aristotle's schema included a fourth possible procedure, M – M', which seems at first to be the counterpart of a simple barter C – C' but is perhaps more aptly formulated as M –M'– M" , whereby money is used to deploy money in order to generate additional money. A further variant, not directly specified in Aristotle, would be a sequence of currency exchanges: £ – $ – ß – €, with perhaps a concluding exchange back into the initial currency, with an overall gain or loss.

These later conventional diagrammatic formulae are rightly claimed as implicit in Aristotle's account, and his analysis is indeed conducted in terms of the differences between 'use' and 'exchange', so that for example the corn or milk produced on an estate is seen as having a 'use' for that household but when a (surplus) amount of corn or milk is exchanged for money in the market the same object is regarded having acquired in Aristotle's terms a new 'form', its monetary 'value'. The terminology and notation now commonly used is 'use-value' (u/v) and 'exchange-value'

(e/v), with a third term often associated with the first two, s/v to mean 'surplus value'.

Much post-mediaeval economic thinking has revolved around the relation between these terms, and this familiar modern terminology is undoubtedly derived from Aristotle's characteristically laconic and highly compressed remarks in the *Nicomachean Ethics* (Book V, chapter 5) and in the *Politics* (Book 1, sections 8-10), which have influenced almost all subsequent thinking about 'economics', most obviously and explicitly in the arguments of Adam Smith, Ricardo, and Marx, but also in the neoclassical and later monetarist schools. A recent anthology of historical passages purporting to trace the lineage of monetarist thinking, and published under the aegis of the Mises Institute as recently as 2020, includes as its first extracts Aristotle's remarks about exchange and the household economy, in effect claiming Aristotle as the first monetarist.

Nevertheless, as an impressively detailed study by Scott Meikle, *Aristotle's Economic Thought* (1995), cogently argues, almost all modern economic theorists have profoundly misunderstood Aristotle's own position. As a rare exception, Meikle singles out Thomas Aquinas's lucid exposition in his *Commentary on the Nicomachean Ethics*, written in the last years of Aquinas's life, around 1286. We will return to the implications of Meikle's analysis and Aquinas's *Commentary* but for the moment I want to go back to the medieval Treasury of Canterbury Cathedral and its apparently peculiar 'economy'.

household

Aristotle's frame of reference is clearly relevant to the Canterbury monastery, regarded precisely as a 'household'. The cathedral was itself the 'house of God' but was also part of the 'house' of the monks, the monastery. I indicated earlier a comparison between the royal treasury and the monastic treasury, but there was an important difference. The Royal Household was in effect a peripatetic court, fairly constantly travelling, spending time at the King's numerous 'houses'. The detailed survey in Colvin's *History of the King's Works* usefully indicates the number and location of those palaces. A well-known passage in the Anglo-Saxon Chronicle specified the three traditional occasions, Easter, Whitsuntide, and Christmas when the King 'wore his crown' at three different palaces, respectively Winchester, Westminster, and Gloucester, but the Royal travels were far more extensive than these ceremonial events. The practice of royal 'progresses' was long retained not simply to accommodate a monarch's propensity for hunting, or so that the King's law could be locally administered and Royal power displayed, but also to enable the King and his considerable entourage to "live off his own", in other words to benefit from the agricultural produce of his extensive royal lands by actually consuming the products on the spot.

When John Stone records the various Royal visits to Canterbury, whether *en route* to Dover or otherwise, part of the rationale for such occasions was so that the Archbishop as the King's tenant could provide for the needs of the travelling court. One might recall the scenes in *King Lear* where Lear angrily demands the continuing accommodation of his travelling retinue of knights at his daughters' households. That they are now unwelcome and dismissed as superfluous, a useless and unnecessary surplus, is one index of his loss of kingship.

In many respects, the archiepiscopal province of Canterbury was similarly organised so that the Archbishop could conduct his own 'visitations' and oversee the ecclesiastical courts by travelling from one archiepiscopal palace to another, each with its own associated land. A map showing the various 'houses' of the Archbishop indicates the considerable geographical extent, not just those which allowed him to make overnight stops on the way to his frequently required attendance at the royal court in London or elsewhere, but to enable regular and widespread travelling across his extensive archdiocese, again with a fairly substantial retinue which would consume his tenants' produce directly.

By contrast, of course, the monastic community as a whole remained located in one place, the monastery itself. Since it was the agricultural produce of their many and scattered estates or granges which provided the food necessary for the community, those products had to be somehow transported to the monastery, rather than the monks themselves travelling to take advantage of them. It was therefore not surprising that the monastic communities were among the first English agricultural estates to encourage or even mandate that their tenants paid their monastic landlord in 'cash' rather than in kind, though the cash might itself take a variety of forms, including credit notes.

The function of those monastic estates was precisely to produce a surplus, more than the tenants needed for themselves, so as to provide for the monks, but such agricultural products could be sold locally or otherwise exchanged for payment which could then be far more easily conveyed to the monastic Treasury, which would then transform that payment back into the purchasing of food or other necessities for the community to consume.

In other words, the geographical spread or diffusion of the monastic estates in relation to the fixed location of the monastery itself tended to generate a more regular use of the C – M – C' model, as a kind of delayed direct barter, a local commodity exchanged for a similar commodity elsewhere, using 'money' as a convenient medium. The C – M – C' model was in effect divided into two stages separated by both time and distance: C –M at a market near the agricultural estate and M – C activated by the Treasury in Canterbury. Such a transfer of payment rather than transporting actual product to the monastic Treasury also reinforced the possibility of the further overall process M – C – M', as exemplified in the instances cited earlier of the Prior buying local city properties to rent out at a profit. The

function of the monastic estates was thus designedly two-fold, agricultural production and a version of monetary exchange, a form of portable surplus. From this perspective, the compact Aristotelian 'household' had been transformed into a systematically connected set of dispersed functions, a system characteristic of the monastic 'economy' though not unique to it.

There was moreover another two-fold surplus in play in the monastic economy. Pope Gregory the Great had clearly stipulated how clerical income should be spent. Bede records the answer of Gregory to Canterbury's missionary Augustine:

> Now the custom of the Apostolic See is, when bishops are ordained, to charge them that, in every stipend that comes in, four portions must be made: that is to say, one for the bishop and his familia for hospitality and entertaining; another for the clergy; the third for the poor; the fourth for repairing churches.

The conduct of the monastic Treasury's business in terms of a partly monetary income more easily enabled a surplus to be allocated to the poor. Feeding paupers at the gate of the Canterbury almonry with no longer fresh fruit and vegetables delivered from a distant estate in Norfolk might not have been advisable or welcome. Nor would an offer simply to say prayers for the poor, rather than actually feed them, have quite fulfilled the monastery's charitable obligations. Yet, in effect, 'prayer' constituted a further layer of the monastic economy, with its own peculiar exchange system.

Note that it was a significant advantage of prayer that it was a 'commodity' singularly liberated from the constraints of both place and time, even more so than 'money' itself. A prayer could be directed to the dead Saint Thomas Becket from any location whatever, since he was himself now potentially 'everywhere', though the monastery certainly encouraged a physical journey to the shrine, and many of the accounts in the register of miracles refer to grateful pilgrims coming to Canterbury with attestations by their local clergy as to the person having already been cured by Becket's intervention in their home parish. Naturally, a long-distance monetary contribution in whatever form was also acceptable. Conversely, retribution for failing to make a suitable recompense for Becket's favours might result in an unwelcome 'visit' from the saint himself, undeterred by any mere distance.

The monks were however happy to take long-distance orders for their own prayers and they were also able to offer a perpetual Chantry service to continue operating well beyond the mere life-time of a client, impinging even upon the peculiar temporal realm of purgatory itself. Their economy was thus relatively independent of both space and time constraints. Details in the miracle windows illustrate several acceptable variations: prayers could be requested at a distance, together with simply a spoken promise to pay;

holy water could be physically brought from the shrine; Becket could make a long-distance personal appearance, or two, if necessary; coin of the realm could be paid at the shrine itself, or replaced by designated acceptable alternatives such as lengths of golden thread or wire, silver models of cured limbs, or expensive beeswax candles. It was a highly flexible exchange economy, one not restricted to a physical market-place like the Buttermarket immediately outside the Christ Church gate. Indeed, not necessarily restricted to measurable market calculation at all, given that the potential reward for sponsoring a prayer was perhaps a truly infinite benefit.

incommensurables

We can now return to considering paid prayer in the light of Aristotle's comments on use and exchange, which were admittedly not directed to deciding how much a prayer was worth. However, adopting the quasi-Aristotelian terms as they are normally deployed in modern economic discourse arguably obscures one crucial aspect of Aristotle's argument.

In fact, Aristotle did not himself use the terms 'use-value' and 'exchange-value', for a good reason, and Karl Marx glimpsed the underlying problem. There are two paragraphs in *Capital* which confidently outline the distinction between use-value and exchange-value:

> The usefulness of a thing makes it a use-value. But this usefulness does not dangle in mid-air. It is conditioned by the physical properties of the commodity, and has no existence apart from the latter. It is therefore the physical body of the commodity itself, for instance iron, corn, a diamond, which is the use-value or useful thing. This property of a commodity is independent of the amount of labour required to appropriate its useful qualities . . Use-values are only realised in use or in consumption. They constitute the material content of wealth, whatever its social form may be. In the form of society to be considered here they are also the material bearers of exchange-value.

And:

> Exchange-value appears first of all as the quantitative relation, the proportion, in which use-values of one kind exchange for use-values of another kind. This relation changes constantly with time and place. Hence exchange-value appears to be something accidental and purely relative, and consequently an intrinsic value, i.e. an exchange-value that is inseparably connected with the commodity, inherent in it, seems a contradiction in terms.

The distinction seems clear enough — at first. But there is an intriguing moment in his writings when Marx suddenly asks himself a basic question about those terms and confronts a veritable 'contradiction in terms'. In the notebooks of drafts for *Capital*, the *Grundrisse*, we find the following:

> The use-value which the worker has to offer to the capitalist, which he has to offer to others in general, is not materialised in a product, does not exist apart from him at all, thus exists not really, but only in potentiality, as his capacity. It becomes a reality only when it has been solicited by capital, is set in motion, since activity without object is nothing, or, at the most, mental activity, which is not the question at issue here. As soon as it has obtained motion from capital, this use-value exists as the worker's specific, productive activity; it is his vitality itself, directed toward a specific purpose and hence expressing itself in a specific form. In the relation of capital and labour, exchange-value and use-value are brought into relation; the one side (capital) initially stands opposite the other side as exchange-value –

At this point, interrupting the flow, there is a long note by Marx, a side-thought or marginal jotting, which begins (my emphases):

> Is not value to be conceived of as the *unity* of use-value and exchange-value? In and for itself, is value as such the *general form*, in opposition to use-value and exchange-value as particular forms of it? Does this have significance in economics? Use-value presupposed even in simple exchange or barter. But here, where exchange takes place only for the reciprocal use of the commodity, the use-value, i.e. the content, the natural particularity of the commodity has as such no standing as an economic form. *Its form, rather, is exchange-value.* The content apart from this form is irrelevant; is not a content of the relation as a social relation. But does this content as such not develop into a system of needs and production? *Does not use-value as such enter into the form itself, as a determinant of the form itself, e.g. in the relation of capital and labour?* the different forms of labour?—agriculture, industry, etc.—ground rent?—effect of the seasons on raw product prices? etc. If only exchange-value as such plays a role in economics, then how could elements later enter which relate purely to use-value, such as, right away, in the case of capital as raw material etc.? How is it that the physical composition of the soil suddenly drops out of the sky in Ricardo?

Apart from its fascination as an example of Marx struggling with an apparent blockage in his own thinking, this tortuously probing passage has a particular interest if we ask in what sense 'value' is a term which can even be used in both 'use-value' and 'exchange-value'.

In Aristotle's own frame of thought, 'use' and 'exchange' came under logically different analytical and ultimately ontological categories, those respectively – in a characteristically compressed shorthand – of 'quality' and 'quantity'. In his brief but foundational text entitled *Categories* he had outlined a vocabulary of distinctions which have been almost ineradicable from much philosophical thinking ever since, despite various objections, refinements, and proffered alternatives. The modern term 'category mistake' derives from Aristotle's insistence that different ontological 'categories' cannot be conflated, including in a related sense that, for example, the number nine and the taste of a sausage, a concerto and midnight, a horse's speed and the smell of sulphur, each require quite different modes of analysis, different frames of understanding, specific sciences, and cannot simply be analysed or understood in the same way, even though scientific investigations might indicate possible correlations or connections relevant to their relationships, while poetic metaphors, rhetorical analogies, and surrealist imaginings can often persuasively or creatively associate them. You might talk about the colour of last Tuesday but you could hardly paint it, or express a measure of hope but you couldn't multiply it by tomorrow. Crucially for Aristotle different 'uses' are not commensurable with each other: the *use* of a song cannot be 'measured' by the *use* of a combine harvester.

For Aristotle, the usability of a particular object is a matter of its 'quality', often its actual material make-up, such that it can indeed be used for particular purposes. More generally, Aristotle deployed two senses of what we call 'matter'. A physical object is indeed made of matter as distinct from an immaterial entity. But any entity is ontologically composed of both 'matter' and 'form' and it is a particular combination of what Aristotle called form and matter which constitutes the item itself in such a way that it 'has' a use, can possibly be used in a way specific and appropriate to its very nature or existence as that entity. That combination is what gives a object its useable 'quality', most palpably in such natural products as timber or woods differently suitable for burning as fuel or for making tables or carving statues. Particular kinds of leather are specifically useful or appropriate for cobbling shoes or being transformed into skins useable in the scriptorium.

But then the usability has to be actually used, put into operation, and thereby the 'matter' itself is given a new 'form', that of a manuscript or a carving. And a left shoe has a different form from a right shoe even if they are made of the same material matter. A cobbler make shoes and in particular a good cobbler makes good shoes, including a left shoe different from a right shoe. The basic matter remains but is given a new form and it is important for Aristotle's ontological or metaphysical position that matter cannot exist without a form and a form cannot exist without some 'matter' to inform, even if in our terminology the most fundamental physical matter might be regarded as 'energy' while the 'matter' of, say, a lecture might be

'ideas' or 'arguments' given form or shape by the organisation of the lecture.

This fundamental distinction also applies to 'money' since a unit of currency, an ounce of gold, a pound-note, or a dollar, may have the 'form' of money while its 'matter' can be a physical coin or a piece of paper or simply a digital number in a bank account. Which is one reason why 'money' can operate as a flexible medium of exchange, why 'it' can have that 'use'. But no amount of money can, in Aristotle's sense, trans-form a 'quality' into a 'quantity'. The composite term 'use-value' would therefore misleadingly elide the issue.

Nevertheless, any 'exchange' seems necessarily to involve some form of measure, quantity, or number. Yet the 'price', expressed in some numerical unit, for which an object might be exchanged in a market transaction, is not part of its 'matter' in the sense of its specific substance, its usable quality. Nor is the price in Aristotle's related terminology an 'accident', a dependent property of that object, though the modern use of the term might categorise the price which happens to be demanded or paid as an accident arising from a particular occasion, a specific exchange – since the price might well be different on some other occasion or in some other context though the object has not otherwise changed.

Certainly, a 'price' could not be directly located in a scientific dissection or analysis of an object's physical matter. A price is not for Aristotle a 'quality' of the object itself, a constitutive component which might be discoverable by examining the item. Yet in order to be exchanged an object has somehow to be regarded or treated as 'commensurable' with that for which it is exchanged. Which seems to indicate that there must be some common measure between any two commodities which are exchanged for each other, or indeed for the money for which either is exchangeable. But what then is being measured? How does any such commensurability apparently arise? How could a matter acquire a different form while remaining the same useful object? Hence Marx's nagging note to himself.

Certainly, a physical unit such as a single apple does not somehow intrinsically match a single unit of a currency. Accordingly, Aristotle very concisely considers several ways in which 'use' might be related to 'exchange', how one might be measured in terms of the other, how a quality of use can apparently be 'trans-formed' into a quantity of exchange. He thereby poses briefly and lucidly the central problem of, and anticipates in outline the various possible approaches of, most later economic theories.

But he finally concludes that there is simply no coherent or 'scientific' way of solving the problem. As he writes (NE 5, 1133^{b}19-20):

> **τῇ μὲν οὖν ἀληθείᾳ ἀδύνατον τὰ τοσοῦτον διαφέροντα σύμμετρα γενέσθαι, πρὸς δὲ τὴν χρείαν ἐνδέχεται ἱκανῶς. ἓν δή τι δεῖ εἶναι,**

τοῦτο δ' ἐξ ὑποθέσεως· διὸ νόμισμα καλεῖται· τοῦτο γὰρ πάντα ποιεῖ σύμμετρα· μετρεῖται γὰρ πάντα νομίσματι.

> It is impossible that things so greatly different be made commensurate according to reality, but they agree sufficiently by comparison with the needs of man, and so there must be one measure determined by man. And this is called money, which makes all things commensurate inasmuch as they are measured by money.

Or, differently translating the first sentence:

> Really and in truth it is impossible for things so very different to become commensurate, but in respect of need [*kreia*] they admit of being so sufficiently.

Thomas Aquinas glosses this conclusion in his detailed commentary on the *Ethics* (section 988-9):

> *Manifestat autem quae dicta sunt per hoc quod communicatio esse non poterit si non sit commutatio: quae non erit, si non constituatur aequalitas in rebus, et si hoc non sit, non erit commensuratio* . . etc

> [Aristotle] clarifies what has been said by stating that association [community, Aristotle's *koinonia*] is not possible if there is no exchange. But exchange is impossible unless an equality is established in goods, which in turn cannot exist without commensuration.
>
> Then, at "it is impossible," he shows in what way currency is used as a measure. He says that it is impossible that things so greatly different be made commensurate according to reality, i.e., according to the peculiar nature of the things themselves. But they can be sufficiently contained under one measure by comparison with the needs of men. Hence there must be some one criterion that measures all things of this kind and is not a measure by reason of nature but because so fixed by men. Therefore this is called money owing to the fact that it makes all things commensurate insofar as they are measured by money.

In effect, if we fully register this conclusion, Aristotle is logically ruling out any fully satisfactory or scientific solution to the problem as it has often been subsequently posed. Which therefore implies that any fully coherent 'economic theory' is strictly impossible.

The passage concedes that some kind of 'sufficient' account (a 'hypothesis') might be related to the 'needs of men' and that a 'measure' can in practice be 'fixed by men', in Aquinas's phrase. In other words, it would not surprise Aristotle, or Aquinas, that a fully coherent 'economic theory' of

prayer has escaped us, since there can actually be no fully rigorous economic theory which explains how in any event 'quality' or 'use' can be converted into 'quantity' or money. The best 'hypothesis' we can offer meets only the lower criteria of what Aristotle elsewhere calls *akribeia*, a degree of accuracy or coherence appropriate to the topic being discussed but not a fully rigorous knowledge, a genuine science, or *episteme*.

Scott Meikle remarks (p.17) that Aristotle's notion of a categorial incompatibility means that 'a product which is the subject of exchange must be the bearer of two quite distinct natures which are conjoined, as it were, in a hypostatic union'. In other words, the 'economic' problem is ontologically or logically similar to that of combining human nature with divine nature in the incarnation, a 'theological' issue which obviously intrigued Thomas Aquinas (but obviously not Aristotle), as would the cognate issues involved in the notion of the Trinity itself.

It is therefore not surprising, though he does not himself suggest such a consonance, that Aquinas was one of the relatively few commentators who recognised that Aristotle had explicitly *not* solved the problem of relating use and exchange, and in a sense had therefore not constructed an economic 'theory' at all. If Aristotle's logic is correct, the implication was that it is strictly impossible to solve the conundrum, and it is therefore clear why the long history of subsequent arguments has signally failed to resolve the issue.

One might here, perhaps unfairly, recall the opening of Aristotle's *De Sophisticis Elenchis* (164a):

> That some reasonings are genuine, while others seem to be so but are not, is evident. This happens with arguments, as also elsewhere, through a certain likeness between the genuine and the sham . . So it is, too, with inanimate things; for of these, too, some are really silver and others gold, while others are not and merely seem to be such to our sense; for example things made of litharge and tin seem to be of silver, while those made of yellow metal look golden. In the same way both reasoning and refutation are sometimes genuine, sometimes not.

And at 171b28 : 'The art of sophistry is a form of money-making from a merely apparent wisdom.'

As with squaring the circle, it seems, any rigorously logical 'economic theory' would for Aristotle unavoidably be a sophism. On this reading, today's 'economists' are the new sophists – a judgement polemically articulated by numerous critics, for example Steve Keen in *Debunking Economics* (2011).

At *NE* 1164a15 Aristotle acknowledges that the professional Sophist Protagoras at least had a solution to calculating his own fee: 'whenever he taught anything whatsoever, he bade the learner himself assess the value of the knowledge to him, and accepted the amount so fixed.' Not a solution

likely to be endorsed by most financial service providers or professional economists today.

book prices

It may now be useful relief, or at least more interesting, to detour for a moment from Aristotle and the Treasury, and briefly consider the work of the monastic scriptorium, as an activity which indeed produced what are now 'valuable' commodities. Some of the monastery's manuscripts would themselves have been kept in the Treasury, regarded as precious for different reasons: as liturgical service-books, often beautifully decorated and lavishly produced, or even as relics in their own right, including for example what may once have been the martyred Saint Alphege's own breviary or book of prayers. Other manuscripts would have been kept in book cupboards in the cloisters, to be studied or copied for use in the monastery itself or made available to be copied by visitors from other monastic communities.

There is some evidence of professional scriveners being brought into the monastery, as well as purchases of manuscripts by monks travelling to Rome and elsewhere, but normally the monastery produced manuscripts for its own use by copying or by original composition. The making of manuscripts involved several different kinds of work, not just the laborious writing of the script and the (prayer-full?) intellectual effort and learning required, but also the several demanding tasks of preparing the parchment or animal skin, grinding the coloured inks, binding the finished manuscript, and so on.

So let us indulge in a little side-amble. Nowadays, such mediaeval manuscripts can command very high prices in book-dealers' catalogues and at auctions. For example:

> BIBLE, Cistercian, Books of Isaiah, Jeremiah, Ezekiel, Daniel, Epistles, Acts, Apocalypse and Gospels. Illuminated manuscript on vellum, Lombardy, Italy, 1170-90. 460 x 310 mm, 251 leaves on parchment, substantially complete. £250,000.

Or:

> *Viridarium Gregorianum sive Biblia Gregoriana,* New Testament (A Garden or Bible of Gregory). FOURTEENTH-CENTURY MANUSCRIPT OF A RARE NEW TESTAMENT COMMENTARY COPIED BY A NAMED SCRIBE. JACOBUS FOLQUERIUS (JACQUES FOUQUIER). In Latin, decorated manuscript on parchment, Southwest Flanders or Hainaut (Tournai?), c. 1350. Dimensions 240 x 170 mm., 120 folios, complete, catchwords in red and brown ink, quire signatures, written by a single scribe in a university bookhand, scrolling cadels at top

lines sometimes in human and animal forms, numerous red and blue/black penwork initials of five to seven lines... £ 66,780.43.

One might quibble at that 43p in the price, and perhaps want clarification as to why the manuscript is exceptionally 'rare' : because that particular commentary is uncommon (only three other manuscripts) or because the day-to-day labour in a scriptorium has not often been marked by a surviving personal signature, in this case an otherwise unknown 'ludofus'.

Or consider the following catalogue entry, not even for a manuscript but for an early printed edition of several works by Aristotle:

> *Opera nonnulla. Hoc in volumine continentur infrascripta opera Aristotelis* . . Published by per Gregorium de Gregoriis expensis Benedicti Fontanae, Venice, 1496. Hardcover. Condition: Very Good. 1st Edition. July 13, 1496. Folio (311 x 215 mm). [4], 403 (i.e., 503), [1] leaves. . . 44 lines and headline, types 135G, 110R; printer's device and colophon on QQ6r, . . woodcut diagrams in text, ornamental and historiated woodcut initials on black ground. . . British Museum Cat. V 349. - RARE FIRST AND ONLY EDITION IN THIS FORM. The only *Opera Latina* of Aristotle printed in the 15th century as a single, unified edition . . £38,900,

Obviously, some of the quantifiable physical features of a manuscript or book as an object can be objectively specified and accurately listed, such as its size, number of pages, and weight, which together may accurately indicate delivery charges as part of the overall price. Some of the features described might be attributed to the amount of work and the degree of skill or 'labour power' which helped to make a specific manuscript, since the 'quality' of the parchment and the illumination would always have made it 'costly', an expensive item in its own day. Though it would surely be odd to claim that one could now calculate or actually measure that long-past labour in setting today's price. It might also be objectively the case that the volume includes a text properly attributed to Aristotle and is itself exactly datable, though both factors might be subject to expert judgement, and questions of forgery or perhaps a faked binding might arise.

However, a book or manuscript's alleged 'rarity' is not an attribute I could establish solely by examining the item itself, but only by comparing it with any other instances, according to various different criteria which would partly depend upon the 'use' for which I intended to buy the volume. As an editor of Aristotle I might be interested in an unusual version of the text, a feature perhaps of no interest to a historian of book-binding, or I might be a scholar of mediaeval illumination or handwriting, or interested in the output of a particular scriptorium. Most likely these days, the manuscript will be bought by a 'collector', perhaps a wealthy individual with no particular interest or competence in reading the text at all but attracted

precisely by a manuscript's alleged 'rarity' as a trophy purchase and potential investment.

These various possible 'uses' might influence, in different ways, the 'asking' price indicated for a volume and any 'sale price' eventually paid for it. The rarity of a book and the scarcity of purchasers able and prepared to pay for it might well be decisive in any price eventually agreed between seller and buyer. But it would be peculiar to claim that any eventual price was the 'correct' price or could be 'scientifically' arrived at by simply examining the manuscript or book. As any browser of antiquarian book fairs can readily confirm, the prices are not 'objectively' arrived at but 'fixed by men', to use Aquinas's phrase. In the actual circumstances of an antiquarian book-fair a dealer might well offer a different "best price" at different times and to different customers with different levels and kinds of interest in the item, and with differently-sized wallets. In Aristotle's terms, neither the matter nor the form of a manuscript or book can determine its price except as 'fixed by men'.

It might be argued that the 15th-century printing revolution made more 'scientific' pricing possible, not just for books but as a template for later developments in the mass production of commodities of almost every kind. Every manuscript had been, after all, not so much rare as unique, a hand-made one-off. Printing was by some definitions the first example of uniform 'manufacturing', of production and reproduction by machine, a development which tended to make almost obsolete some claims of 'rarity' in relation to books. A specific printed text could be made available in multiple identical copies, and in a range of different forms or 'formats', catering for different intended users, as a scholarly edition, a school text-book, or for recreational reading. In particular, it may be that the 15th-century upper-class vogue for printed and partly bespoke personal 'books of hours' helped displace the 'demand' for monastic prayers by the fashionable proliferation of abbreviated hand-books used for individual devotional practice, do-it-yourself domestic prayer. Today, surviving examples are not even rare and one could relatively easily pick up, say,

> *Book Of Hours,* Use of Rome, in Latin, illuminated manuscript on vellum. Flanders, 3rd quarter of the 15th-century, c. 1465-1475. Small 8vo., 96 x 68 mm, height 4 inch. 223 leaves on parchment

– for a mere £95,000. Even 'books of hours' were at first produced in quantities of only a few hundred copies.

The earliest genuinely mass produced printed items were in fact indulgences. As Paul Needham notes, in *The Printer and the Pardoner* (1986), the first Gutenberg-Fust Bible dates from autumn of 1454 and before the end of that year both the Mainz shops, the now separate establishments of Gutenberg and Johann Fust, had both issued their first printed indulgences, though in what number is not known. By the end of the 15th century

probably about 600 printed editions of indulgence instruments may have been produced, more than any other single class of early job-printing. For every printed indulgence edition that survives, several other editions may well have disappeared without trace. For example, between 1498 and 1500 the Benedictine convent of Montserrat in Catalonia commissioned the printing of more than 200,000 indulgences of which only six examples are now extant. In 1500 the Bishop of Cefalu in Sicily paid for producing more than 130,000 or so indulgences, none of which are known to have survived .

It is worth recalling that it was the early development of an online antiquarian book-dealers' website, the Advanced Book Exchange, or ABE, catering for those searching the globe for closely specifiable copies of desirable but hard-to-find second-hand or 'used' volumes, which provided the precursor and original model for the later behemoth Amazon, a global conglomerate designed to sell an ever-expanding range of everyday retail commodities online by using essentially the same template for online purchasing as the original ABE. The face-to-face bartering at a book-fair over a flexible 'best price' has now been transmuted into the algorithm-led 'dynamic pricing' activated on any Amazon website, generating some two million automatic rapid price changes on its sites every day, with an almost instantaneous adjustment of the relation between apparent online 'demand' and whatever 'competitive price' Amazon cares, momentarily, to offer. Clearly Amazon's algorithms are not designed to calculate a 'correct' price but one which will sell as many items for as large a profit as possible. As 'fixed by men', and algorithms.

Aristotle's aporia

Aristotle did consider various possible solutions to the aporia he had posed, using as an example the exchange of a house and shoes, or the relation between builder and cobbler, but he doesn't finally endorse any solution as adequate. The main post-mediaeval schools of 'economic theory' tend to have elaborated upon the several different solutions which Aristotle had already considered and rejected. On the one hand, Ricardo argued that a price could be based upon the labour which had gone into the making of a product, as part of its substance, and that the amount of labour can, at least indirectly, be measured, for example in terms of the time expended. Marx modified this position to argue that it is 'labour power' which can be measured in so far as it is 'used up' in the process of making a commodity, and the minimal cost of labour can itself be calculated according to the basic needs of the labourer. We have already quoted elements of Marx's own approach.

A major alternative position, partly derivable from Jevons, as outlined in his *Theory of Political Economy* (1871) postulated that it was indeed possible to assign a measurable 'value' to various objects or activities, ultimately

calculable in terms of the 'pleasure' or 'pain' they might engender in their user. For Jevons, pain and pleasure could be measured as a matter of intensity and duration, both of which could allegedly be given a numerical grading, not only comparatively, as 'more or less', but in potentially infinitesimal increments suitable to treatment by the calculus – though there obviously remains an awkward problem as to how to compute my pain tolerance in relation to your pleasure threshold. Jevons's work eventually developed into 'marginal utility theory' and also initiated the extensive mathematisation of economic theories and models, even anticipating the use of logic-based computer programming and simulations. His multiple progeny may now occupy leading positions in most economics department but his paradigm shift is now given insufficient credit, or blame (see Margaret Schabas, *A World Ruled By Number*, 1995).

Any full critique is beyond these wandering considerations on a medieval Treasury, but both these major overall approaches run into the preliminary problems articulated by Aristotle. The fact that the thousand words I have just written took me two hours of hard effort rather than, say, ten minutes of spontaneous scribbling is not itself a reliable basis upon which to decide what 'value' those words have, even if I might be lucky enough to be paid 'by the line' or contracted for producing a specified number of words, whether 'in the right order' or not. Still less is it likely for there to be any agreed calculation as to how much pleasure or pain those thousand words might give to different readers. Both Marx and Jevons, and their numerous successors, have endlessly elaborated their respective positions to try to circumvent such problems, spawning in the process such concepts as 'socially necessary labour time' and 'abstract labour' or 'Sonnenschein-Mantel-Debreu conditions'. But Aristotle's core problematic has arguably remained. What, he might have asked, is the use of this book and how would you measure it.

At one point, however, Ricardo at least momentarily registered that any 'economic theory' is not reliably constructed upon objective science or subjective measurement but is also generated by class interests. In a moment of illumination he recognised that, for example, the Luddites were perfectly correct to argue that the use of the new machinery was an economic disaster, not only for them in practice but in terms of their own analytical viewpoint. In his early *Essay on Profit* Ricardo had remarked upon 'the effects of improved machinery, which, it is now no longer questioned, has a decided tendency to raise the real wages of labour.' On the other hand, he argued:

> A fall in the price of corn, in consequence of improvements in agriculture or of importation, will lower the exchangeable value of corn only, the price of no other commodity will be affected. If, then, the price of labour falls, which it *must* do when the price of corn is lowered, the real profits of all descriptions must rise. [my emphasis]

The assumption behind the claim that wages 'must' fall is that prices and wages are not 'fixed by men' but 'determined', so that it is not a matter of choice that employers reduce wages but somehow predetermined, for reasons themselves still to be determined. As he had written to McCullough, on 21st August 1823:

> Is it not clear that as soon as we are in possession of the knowledge of the circumstances which *determine* the value of commodities, we are enabled to say what is necessary to give us an *invariable measure of value*. [my emphasis]

Piero Sraffa, in his 1951 introduction to his critical edition of Ricardo's *On The Principles of Political Economy and Taxation,* remarks: 'The search for what has been called "the chimera of an invariable standard of value" preoccupied Ricardo to the end of his life'. Yet there is a moment in the third edition of the *Principles*, in a new chapter 'On Machinery', where Ricardo retracts the notion that the introduction of machinery is inevitably 'determined' to be beneficial to all the different classes of society:

> My mistake arose from the supposition, that whenever the net income of a society increased, its gross income would also increase. I now, however, see reason to be satisfied that the one fund, from which landlords and capitalists derive their revenue, may increase, while the other, that upon which the labouring class mainly depend, may diminish. (p. 388)

A few pages later he acknowledges:

> . . . the opinion entertained by the labouring class, that the employment of machinery is frequently detrimental to their interests, is not founded on prejudice and error, but is conformable to the correct principles of political economy. (p. 392)

The relevant difference is not only that between 'gross' and 'net' income but from where one experiences or undergoes that, and several other, 'differences', which rather 'determines' what one sees as 'conformable to the correct principles of political economy.' As Sraffa wryly remarks: 'His conclusion must have shocked his friends even more than the change of principle itself'.

It is certainly arguable that Marx, despite the enormous effort he put into elaborating variations on a labour theory of value, recognised that in so doing he was essentially creating an intellectual weapon in a struggle which was to be decided or 'determined' primarily by a contest of power, since 'price' in all its ramifications was in fact ultimately 'fixed by men' not by

mathematics or impartial science. As yet, however, both the neo-liberal and monetarist traditions have continued to claim that their own fantasy constructions of 'free' and 'rational' competitive markets are unchallengeably correct descriptions not only of the world as it is but as it 'must' be established by their preferred and inescapable calculus.

The typically laconic remark by Aristotle is again relevant here: that a shoemaker is not someone who makes shoes but someone who makes good shoes. Part of his overall case is that if shoes are made primarily so as to be exchanged for money this involves what Aristotle would regard as a confusion or conflation of ends. He refers parenthetically in *Politics* 1252b2 to a Greek tool, the Delphian knife, which combined several possible uses, as a file, a dagger, and a saw, and was cheap to buy – but performed none of its three functions particularly well by comparison with tools made specifically for each of those separate jobs. Even a traditional Swiss army knife might not have persuaded Aristotle otherwise. His basic point was that trying to fulfil two different aims or ends, of both making a good pair of shoes and making them in order also to 'make' a profit, almost predictably resulted in a compromise in 'quality' rather than a satisfactory combination of usefulness-es with what we now often call 'economy'. Cutting corners is not the best way to make a shoe.

We can once more recall Walter Benjamin's comments on late 19th-century retail shopping, which consider the issue from the viewpoint of a consumer and implicitly connects shoddy tailoring with hack writing for money (as translated by Paul Sharratt):

> Taste evolves with the decisive predominance of commodity production over every other kind of production. The manufacture of products as commodities for the market leads to the conditions of their manufacture—not only the social in the form of exploitation, but also the technical—becoming increasingly removed from the world of the observer. The consumer, who is more or less expert when giving an order to a craftsman—the master craftsman himself instructs him as the case arises —is, as a buyer, usually without expert knowledge. Moreover, mass production, which aims at turning out cheap commodities, must disguise poor quality; it is actually in its interest that the buyer has little expertise in most cases. The more industry advances, the more perfect are the imitations it floods onto the market.
>
> > 'Let it not be objected that the customer, when he goes shopping, will, after all, be familiar with the different qualities of a fabric. No, gentlemen, the consumer cannot judge them: he merely goes by appearance, relying on sight and touch. But is looking and touching sufficient to give an account of the durability of the colours, or to tell how fine a fabric is, or the quality and manner of its finish?'
>
> In the same measure as the consumer's expertise declines, the importance of his taste grows – for him and for the manufacturer. For

the consumer, it serves as a sophisticated cover for his lack of expertise. For the manufacturer, it has the value of a new incentive to consume, which may be satisfied at the expense of other needs of consumption that would be more costly for the manufacturer to meet.

This doctrine, and its corresponding practice, for the first time gives supremacy to taste in poetry. In *l'art pour l'art*, the poet for the first time confronts language in the same way the buyer faces the commodity on the open market. He has lost his familiarity with the process of its production to an especially high degree. The poet of *l'art pour l'art* seeks above all to express himself through language—with all the idiosyncrasies, nuances, and imponderables of his nature. . . At the end of this development stands Mallarmé and the theory of *poésie pure*. In this theory, the poet has withdrawn from the cause of his own class to such an extent that the problem of literature without an object takes centre stage. This discussion takes place not least in Mallarmé's poems, which revolve around the *blanc*, the *absence*, the *silence*, the *vide* . . These difficulties make this poetry esoteric.

At the end of these developments lies, also, Amazon.com. I can now download and even buy Mallarmé's poems with just one click. Unfortunately, in an unreadably jumbled digital e-book format.

domestic economy

Let us now reconsider the notion of the 'household' and focus on the 'house'. Bearing in mind the work of William Morris, partly echoed in Benjamin's comments. When products are made and intended for use within the household itself, their useability or quality will normally be as 'good' as the household is able to choose to make them, and probably produced as efficiently and cheaply as is compatible with that quality. Part of the point about the relation between household 'sufficiency' and 'efficiency' is that any supplementary surplus may well involve little extra work or input but produces a suitably 'good' gift for friends and neighbours. It is in the interests of the household that its products for its own use should be characterised by good quality workmanship. Which also applies to maintaining and repairing the house itself. The house is a need (*krei*) and the core need of a household. When Aristotle concludes that:

> Really and in truth it is impossible for things so very different to become commensurate, but in respect of need [*krei*] they admit of being so sufficiently

the point is fairly obvious in relation to the activities of a household, where what the house *needs* has to be balanced with what it can afford to make,

what it wants to use compared with the effort required to make it usable. It might be remarked that anybody trying to get 'good quality' repairs done upon a house today may well have considerable difficulty balancing professional quality and affordable, or even believable, price estimates, and such transactions can well involve a great deal of reluctant but unavoidable 'credulity'. Anybody know a good plumber?

In the passages where Aristotle talks about what happens to a surplus when it is taken to a market he is almost always misinterpreted, especially in Victorian English translations, as saying that the market price of a commodity can be arrived at based upon the 'demand' for it. But Aristotle's term mis-translated as 'demand' is 'need' or 'requirement' (*krei*). Aquinas's translation uses variations on *indigentia*, as in 'indigent', implying a necessity or lack. The English term 'demand' covers however a range of meanings, including what people simply want, and perhaps ask for, but the implication of such translations is that Aristotle intends the kind of 'demand' measured by the market, which is only defineable in terms of demands actually realisable in the market, as the only measure of how 'demand' is articulated. On this view, if there is no supply there can be no effective 'measurement' of the demand. A protest banner proclaiming 'We Demand Bread' would not count as a market demand, let alone the slogan 'We Demand Peace'.

But Aristotle's position derives not from some anticipation of market research or the neo-classical economics of supply and demand but from the notion that communities, and eventually cities, partly arise because they enable a division of labour whereby people do not have to provide for all their own needs (*krei*) since these can be satisfied by exchanging with others who need what they can provide in return. This can, in due time, develop to include the exchange of non-necessities, of optional wants, desirable luxuries, and so on, but the core of *koinonia*, community, is the mutual provision of needs. Which for Aristotle involves questions of social justice, the shared provision of necessities, and therefore the issue of a 'fair' or 'just' price, a problem quite distinct from the mathematical commensurability of quality and quantity, but certainly one inextricable from prices as 'fixed by men'.

In his commentary on Aristotle's *Ethics*, Albert the Great, Aquinas's own mentor, emphasises that Aristotle also considers the possible use of civic regulation as an alternative to market price 'commensuration', since both procedures are 'fixed by men' but with quite different motivations, including the public good rather than private profit.

> Sometimes the politician puts the market at the disposal of the public, stating what must be sold and at what price, since, if done another way, due to the urgent need of merchandise, the citizens would often suffer excessive harm; so, as it is regulated in the times of shortage, a bushel of wheat is sold at a certain price and not more. Sometimes, these exchanges happen through a mutually agreed bond, without any

misleading deceptive sharp practice, and then it is not the equivalent that is given for the merchandise, but what has been negotiated. Sometimes the exchanges try to establish the equality of the items, so that he who sells shall have the equivalent of what the other person buys. Therefore, in these cases, it is necessary to recognise that a just reciprocity does not always mean a transaction settled in the same way, but sometimes in an equal exchange, occasionally an outcome of negotiation, at times by a ruling. Yet, in these exchanges it is not possible to change a thing for another one, such as a house for a bed, or a bushel of wheat for sandals, since they are neither equivalent nor of equal necessity. . . In fact, this exchange does not happen through the equality of the exchanged things, but rather according to the proportion of the value of one thing compared to the value of the other thing, the proportion having been established on the basis of need, which is the reason for the exchange.

Attempts to settle a 'correct' or 'fair' price by imposed regulation predictably can meet with practical and even philosophical resistance, as for example in an incident involving the Kent magistrate William Lambarde, recounted by Stephen Hipkin in an article on the Kent grain trade :

Lambarde and William Sedley, another commissioner for Aylesford lathe, had been lending a hand . . at West Malling market in order 'to treate with such farmers and corn masters . . as had graine of anie kynd to spare . . at a charitable price for the extreme poore people', and there they encountered Richard Lee, gentleman of Wrotham. The justices told Lee of the price that others 'had liberally and willinglie yealded unto before him', but the farmer was unimpressed. 'That', he replied, 'was noe reason that he that had corne this yeare should geve to the poore in the price of his corne and others that perhaps were an hundred tymes his betters gyve nothing, and said with many and ofen repeticions that there was noe reason in theise orders'. Lambarde, who reckoned himself something of an expert on reason, rose to the bait, and

> then said the simplest man there present would not have said that those orders being made by the wisedome of the whole Realme were voyd of reason, for yf they weare voyd of reason yt is noe better then madness, and that yf he knew what was reason himselfe, he must needes confesse that himselfe was owt of reason. And yet thus yt pleaseth you to heeare your selfe talke thus fondely and presume to say their honours orders are without reason; admitting nothing for reason but that which pleaseth your owne foolish Braine, and therein shew your selfe to be a foole in terming her Majesties and their honours honourable orders to be without reason. Mr Lee then said unto him in greate heate (as all his speech was furiouse) in the

presence of the people with whome wee were then to treate as aforesaid, that he was a fool.

(*Economic History Review*, 61, S1, 2008)

As Hipkin comments: 'Thus, the proponents of rival concepts of reason squared up, and quickly resorted to name-calling.'

A century later John Locke, in *Some Considerations of the Consequences of the Lowering of Interest, and Raising the Value of Money* (1691) effectively concurred with Lambarde's recalcitrant Richard Lee in considering as quite unworkable a proposal to regulate interest rates to 4% maximum:

> The first thing to be considered is, 'Whether the price of the hire of money can be regulated by law?' And to that I think, generally speaking, one may say, it is manifest it cannot. . . that law cannot keep men from taking more use [usury] than you set (the want of money being that alone which regulates its price) will perhaps appear, if we consider how hard it is to set a price upon wine, or silks, or other unnecessary commodities: but how impossible it is to set a rate upon victuals, in a time of famine; for money being a universal commodity, and as necessary to trade as food is to life, every body must have it, at what rate they can get it; and unavoidably pay dear, when it is scarce; and debts, no less than trade, have made borrowing in fashion.
>
> The bankers are a clear instance of this: for some years since, the scarcity of money having made it in England worth really more than 6 per cent, most of those that had not the skill to let it for more than 6 per cent, and secure themselves from the penalty of the law, put it in the bankers' hands, where it was ready at their call, when they had an opportunity of greater improvement; so that the rate you set, profits not the lenders; and very few of the borrowers, who are fain to pay the price for money, that commodity would bear, were it left free; and the gain is only to the banker.
>
> . . for the bankers, paying at most but 4 per cent and receiving from 6 to l0 per cent or more, at that low rate could be content to have more money lie dead by them, than now . . and what a part of our treasure their skill and management, joined with others' laziness, or want of skill, is apt to draw into their hands, is to be known by those vast sums of money they were found to owe, at shutting up of the Exchequer: and though it be very true, yet it is almost beyond belief, that one private goldsmith of London should have credit, upon his single security (being usually nothing but a note, under one of his servants' hands) for above eleven hundred thousand pounds at once.

Locke, having disparaged the bankers (in now familiar terms) and dismissed the possibility of enforcing interest rates, was content like any later free market enthusiast to rely upon Nature herself and to propose that

'the legal use [usury rate] were kept pretty near to the natural; (by natural use, I mean that rate of money, which the present scarcity of it makes it naturally at, upon an equal distribution of it)'. Quite how 'an equal distribution' was to be obtained was even less clear. But Locke might perhaps have concurred with the arguments recently put before the US Supreme Court, that all government regulation concerning pollution, health and safety, climate change, and so on, might be considered unconstitutional.

house exchanges

Let us go back to our houses. In exploring possible 'solutions' to the use/exchange conundrum, Aristotle considers as an example the (in)-commensurability of a house and shoes, or a three-way exchange involving a house, money, and a bed. Does one house equal five minas which equals ten beds? How many shoes should a shoemaker offer to a builder in exchange for a house? Adam Smith and Piero Sraffa were to consider variations on this way of posing the problem, using wheat, iron, and pigs for their own examples. Given the differences between the items involved, this is almost also a way of thinking about currency transactions involving dollars, pounds, and euros.

Initially perhaps, the overall 'building costs' seems a plausible basis for establishing the 'purchase price' of a house. Selling 'at cost price' might even be plausibly calculable – but only if the costs or prices of the components of the entire construction process can also be similarly calculable, leading to a considerable if not quite infinite regress. But now think about the actual 'asking price' today of a house 'on the market', as it might be discussed with your local estate agent, and Aristotle's negative scepticism about 'commensurability' seems immediately more plausible. Admittedly, Jevons also found house sales problematic, since a house is not infinitely divisible and therefore not readily susceptible to the calculus.

We can here briefly trace a certain historical trajectory concerning houses. After all, at the Dissolution Henry VIII expropriated some 850 monastic households and a fair number of them ended up being sold as houses, or at least as the building material for new houses, the revamped aristocratic 'Downton Abbeys' of popular English television programmes, and also as investment opportunities for an always-rising middle class with an eye on the extensive lands and 'properties' newly available 'on the market'. The 16th century Dissolution can even be regarded as a phase within the long history of enclosures, which extended from the land re-distributions of the Norman conquest to the later enclosure acts, and as a decisive stage in the commodification of common land and common rights on a scale to be matched only by the more recent privatisation programmes of the Margaret Thatcher regime.

What resulted from the expropriation of the monastic lands and households was not immediately the emergence of a new 'class' but the removal of the monastic territorial component of the existing overall landowning class and the consequent consolidation of the land-holdings of those who remained – in effect, a partial redistribution via a hostile takeover. In the process, the status of land as a commodity to be bought and sold became significantly entrenched.

right to buy

Some centuries later, Margaret Thatcher's 'right to buy' policy was in effect the privatisation of immense local council assets, a redistribution between public and private by another hostile takeover. Some comments by John Boughton in his *Municipal Dreams* (2018) are worth noting:

> Determined to roll back 'the frontiers of the state', during the eleven years of her premiership she oversaw the sell-off of over forty state-owned businesses, employing 600,000 workers. But by far the largest single privatisation of public goods was the sale of council homes - worth an estimated £22 billion in 1997.
>
> Crucially, there were generous discounts applied to the purchase price, starting at 33 per cent of market value for those with three years' tenancy and rising to a maximum of 50 per cent (to the value of £50,000) for longer-term residents
>
> Further legislation in 1984, which extended the Right to Buy to tenants of two years' standing, and increased maximum discounts to 60 per cent, only underlined the radicalism of this assault on local government provision and ownership. Over 1.8 million council homes were sold by 1997, around one in four of the total. Council housing, which had formed 31 per cent of total stock in England, now formed around one-fifth.
>
> To some, it was a windfall. John Holland, a security guard living on the modernist Whittington Estate in Camden, bought his five-bedroom flat – then valued at £70,000 on the open market – for £39,000 soon after the legislation was introduced. Thirty years later, his home was worth £600,000.
>
> . .the government . . increased the minimum discount on flat purchases to 44 per cent and the maximum to 70 per cent in 1986.
>
> Owner occupation increased from 55 per cent of households in 1980 to 67 per cent in 1997; nearly half that increase due to the 2.2 million council homes bought during the period of Conservative government. Mortgage Interest Relief at Source (or MIRAS), introduced in 1983, which provided tax relief to those borrowing to buy homes, provided another boost. It represented a £7.7 billion subsidy to home ownership by 1990.

It is difficult to see in these figures any implementation of free-market policies or the unfettered application of supply and demand. And all achieved by selective use of government regulation.

The heavily discounted sale of council houses to existing tenants did not directly result in a new 'home-owning' class occupying those same houses but in a far-reaching reinforcement of the commodification of housing itself, which in turn created a situation where 'owning' a house (owing a mortgage on one) increasingly meant that selling a house in order to buy another house as a replacement home also potentially involved selling one house and buying another largely in order to generate a profit (generating layers of fees for ancillary agencies such as mortgage lenders, estate agents, surveyors, solicitors, etc.). Which encouraged not only a rapidation of 'ownership' turnover and an inexorable rise in house prices, with increased profits for construction companies building new private houses, but also considerable adjustments in overall state expenditure and taxation, with implications, as politically and ideologically intended, for the relation between government budget decisions and electoral considerations.

Incidentally, under the municipal ownership arrangements it had always been fairly simple to initiate and agree a house exchange between local council tenants whose circumstances and needs had changed - a family with a new baby exchanging with a recent widower who no longer wanted a large home. An adjustment of council rent was involved but little other expense or bureaucracy.

From Thatcher's national programme of bolstering low-income 'house-ownership' it was a small step to the devastating role of 'sub-prime' house mortgages in the international 2008 financial crash – including, in a new variation, the exploitation of the least financially secure by persuading them to undertake the highest-risk house-purchase deals. And including the further manipulation of disguised high-risk liabilities to ensnare even the allegedly most expert financial operators.

The latest version of this process is crypto-currency snake-oil salesmen targeting those who don't know what a bit-coin is, while simultaneously persuading the largest financial institutions to 'buy into' a currency which apparently generates cashable surplus-value from the alleged speculative future exchange-value of an immaterial product which has no more independent 'use-value' than the trinkets sold to Casaubon's Indians. There is a considerable continuity with the printed indulgences which once promised infinite spurious purgatorial relief while nevertheless actually building Saint Peter's hugely expensive Basilica. Which gives an indication as to where to locate one peculiar equivalent of paid prayer in our present economic system, to be explored shortly.

Meanwhile, for example, a house can now be repeatedly bought and sold as a pure store of value, a way of parking illicit assets, a form of currency transaction or a money-laundering operation through offshore tax-free shell

companies which 'own' numerous houses for perpetual family trusts on behalf on those who will never 'need' to live in any of the actual houses. Meanwhile, mortgages are available for 'buy to rent' investments, a house can 'earn' more than its inhabitants, city centres are transformed by proliferating AirBnB apartments, London 'flats' reduced to $7m^2$, and a generation keeps one eye on a parent's frailty and the other on 'the housing market'. And, meanwhile again, increasing numbers of homeless still have nowhere even to be displaced from.

No doubt there were homeless in Aristotle's time and houses were inherited, exchanged, transferred, even bought and sold, but the modern housing market is an object lesson in what Aristotle would certainly have seen as a confusion of ends, a radical distortion of 'use' for the sake of 'exchange', an incommensurability of community (*koinonia*) needs and individual 'demands'. We have come a long way from the house cobbler making an extra pair of shoes to take to market.

It is perhaps worth remarking that Margaret Thatcher herself grew up in a 'household' which was almost exactly the opposite in its functions from those envisaged by Aristotle. The family apartment was 'above the shop', a small 'family business' grocer's, and the *raison d'être* of the household seems to have been maintaining the grocery business, rather than vice versa: not the surplus from the household being put on the market but what was left from the market providing any grocery necessities in the house. Thatcher as prime minister was adamant that any public expenditure was a kind of unnecessary waste which constituted a reduction in private prosperity, and she maintained that she could oversee the UK economy in the persona of a parsimonious housewife. Her advisers signally failed to persuade her that national finances could not be run like a domestic budget or household balance sheet.

The monastic households looted by Henry VIII constituted one form of community, with a membership chosen by those who wanted a specific way of life. The council houses put on the market by Thatcher had represented and sustained a different and wider model of community, of local elected government providing services and support for all those living within its territory, meeting basic social needs, including houses, water, power, roads, et cetera. The income and wealth of a monastery derived essentially from the accumulation of donations to a specific and highly restricted group. What financed a local council housing department were the legally required contributions of taxation from all residents, to sustain, as Aristotle would have put it, the common good or *koinonia*.

Which takes us to another facet of the mediaeval economy, with some further intertwined implications we can trace. Beginning with the Our Father, or, as one six-year old used to say, the praire tortoise.

*

debita nostra

Trying to think through the relations between monks and money, or 'political economy', takes us into a further range of territories, to be tentatively explored. Consider the theology of debt. Or death and taxes. And a vow of poverty. When we recite the Lord's Prayer, as taught by Christ himself in the New Testament texts (twice), we usually pray, in English, that God the Father will 'forgive us our sins' or 'our transgressions'. The choice of phrasing partly depends on one's preferred denomination. However, in the Latin *Pater Noster* which prevailed in the West for more than a millennium, the corresponding petition is: '*dimitte nobis debita nostra sicut et nos dimittimus debitoribus nostris*'. Which is most obviously translated as 'forgive us our debts as we forgive those in debt to us', or perhaps in more legal parlance: 'remit' our debts as we 'waive' any debts owing to us. The first part of the petition is: '*Panem nostrum quotidianum da nobis hodie*', 'Give us this day our daily bread', which seems to be a perfectly mundane request, especially if we take into account one obvious interpretation of the apparent context – that Christ is speaking to his disciples who have by then become a wandering group largely dependent upon begging for their food, or possibly relying on the occasional miracle.

As with Paul's terminology of grace, to be considered later, a certain slide towards a spiritualised interpretation can be traced. Jerome chose to render the admittedly very odd Greek word **ἐπιούσιον** as the even odder Latin '*supersubstantialem*' (super-substantial?, viz. spiritual?) in the Mattheian version of the prayer (6: 9-13), but as '*cotidianum*' (daily) in the shorter version in Luke (11: 2-4). Jerome presumably wanted to imply a reference to the 'bread' of the eucharist or mass, which might thereby be directly associated with the 'debt' which was 'repaid' at the crucifixion, which the mass somehow re-enacts.

Yet any resonance with the notion of Christ's 'redemption' of us as literally a form of buying back, of redeeming, forgiving, remitting, our 'debt' much like those ordinary debts one encounters in daily ('quotidian') life has sat somewhat uneasily with those who would simply prefer their 'sins' to be 'forgiven'. It may be more attractive simply to 'forgive' those who 'trespass' against us rather than actually to forget or remit their debts to us, still less to take literally some other New Testament injunctions:

> And if you lend to those from whom you expect repayment, what credit is that to you? Even sinners lend to sinners, expecting to be repaid in full. But love your enemies, do good to them, and lend to them without expecting to get anything back. (Luke 6: 34-35)

> Go and sell all you possess and give to the poor, and you will have treasure in heaven. (Mark 10: 21)

It would take us far too far astray to survey the several appearances of debt and related matters in the New Testament (for example, Mt 25: 14-30, the parable of the talents; Mt 20: 1-16, the parable of the workers in the vineyard; Mark 12: 41-44, the widow's mite; Mt 22: 15-20, paying the imperial tax to Caesar, etc.) But some mediaeval theologians had no doubt about the applicability of the quotidian notion of debt to the divine economy and to the Lord's prayer. Here is part of Anselm's 'meditation on human redemption':

> God was not obliged to save mankind in this way [the crucifixion], but human nature needed to make amends to God like this . . and that could not be done unless he [mankind] received forgiveness for all his sins, and that could not be unless he first made entire satisfaction. . . To make such satisfaction it was necessary that the sinner, or someone for him, should give to God of his own something that he does not owe him; and something more valuable than all that is not God. . . Human nature alone could not do this, nor could it be reconciled without the satisfaction of the debt . . [Christ] took on himself all the debt that sinners ought to pay, and this when he himself owed nothing, so that he could pay the debt for the others who owed it and could not pay. More precious is the life of that man than all that is not God, and it is more than all the debt that sinners owe in order to make satisfaction for their sins.

These references to debt, satisfaction, owing, indicate the core meaning of the petition in the *Pater Noster*, and the most relevant New Testament context for this would be Luke 7: 40-47:

> 'A certain lender had two debtors. The one owed five hundred denarii, and the other fifty. When they couldn't pay, he forgave them both. Which of them therefore will love him most?' Simon answered, 'He, I suppose, to whom he forgave the most'.

What precisely the 'debt' is, how it can be repaid, and by what means, exercised the best theological minds of the period. In particular, whether a debt could be paid on behalf of someone else, as for example by paying someone to pray on your behalf for someone already in purgatory. Meanwhile, how to avoid any 'debt' to the divine preoccupied others.

debtors & evasions

The 'biblia pauperum' windows in the ambulatory leading to the shrine, which we looked at earlier, systematically displayed the narrative components of the overall mediaeval belief structure, while the genealogical

windows began with Adam as the crucial first human, the guilty initiator of the original 'debt'. Yet neither series included the Cain and Abel story. It is this second generation of human-kind which can concern us for a moment, and we can turn to another mediaeval genre of vivid representation, the pageant plays of the Corpus Christi dramatic cycle, to provide a suitable text.

In the 'Wakefield' pageants of the Towneley cycle the *Mactacio Abel* tells the tale of the murder of Abel by his brother Cain. As usual, it is the villain who is most dramatically effective and even attractive, inducing almost an identification and then a guilty self-recognition by the audience. The two brothers, sheep-rearing Abel and wheat-farming Cain, are both obliged to pay 'tithes', one-tenth of their produce, as a sacrificial burnt offering to the divinity. Abel's chosen lamb is duly acknowledged and accepted, but the *Genesis* text tells us, without any explanation, that Cain's offering was refused. Why does God regard one offering as not of the same sacrificial value as the other? The mediaeval dramatist provides a theatrically persuasive reason for this divine spurning of Cain: that he was fiddling his obligations. I leave it in its own powerful language

Abel] Bot, leif brother, here my sawe:
It is the custom of oure law,
All that wyrk as the wise
Shall worship God with sacrifice. ..
Gif we hym parte of oure fee,
Corn or catall wheder it be.
And therfor, brother, let vs weynd,
And first clens vs from the feynd
Or we make sacrifice;
Then blis withoutten end
Get we for oure seruyce . .

Cain] What gifys God the to rose hym so?
Me gifys he noght bot soro and wo.

Abel] Caym, leife this vayn carpyng,
For God giffys the all thi lifyng.
Cain.] Yit boroed I neuer a farthyng
Of hym—here my hand. . .
My farthyng is in the preest hand
Syn last tyme I offyrd.
. . Wherof shuld I tend [pay tithe], leif brothere?
For I am ich yere wars then othere—-
Here my trouth, it is none othere.
My wynnyngys ar bot meyn: . .
For bi hym that me dere boght,

I traw that he will leyn me noght. . .
For he has euer yit beyn my fo;
For had he my freynd beyn, -
Othergatys it had beyn seyn.
When all mens corn was fayre in feld,
Then was myne not worth a neld.
When I shuld saw, and wantyd seyde,
And of corn had full grete neyde,
Then gaf he me none of his;
No more will I gif hym of this.
Hardely hold me to blame
Bot if I serue hym of the same.

Petulantly angry that his own crop has been meagre, and that God did not help him out as a neighbourly farmer should, Cain complains that far from 'borrowing' from God he has already lost a farthing to the local priest. Persuaded finally by Abel to offer the sacrifice, Cain does count out his sheaves, but with extended comic business conceals the best for himself and selects only the scrawniest bits, which he then finds he can't even set alight for the burnt offering. Meanwhile, Abel's sacrifice is duly burned and accepted. And Abel is duly killed by Cain.

The play does not explain why one brother is evil and the other good, and we don't need to discuss here the typological significance of Abel's lamb as 'type' of the future sacrificial Christ, or the anti-Semitic attribution of allegorical roles for the Jews as Cain-like murderers of the Messiah. Nor does *Genesis* or the play take sides in some incipient class-conflict between protagonists who might figure in a John Ford western, the cattle-man and the corn-grower. The main action of the play is in effect a dramatising of a remarkably early, but still familiar, form of tax evasion.

In the present context of considering the Treasury, it is the ancient notion of the tithe obligation itself which is interesting. The insistence on a 'tenth' obligation may have had its explanatory origins in the notion of supporting the tribe of Levites, one of the ten Israelite tribes, whose particular function was that of priestly service in and care for the Temple. There would be a long debate in later Christian writings concerning the validity of perpetuating some version of 'tithing' to support a Christian clergy as the supposed 'successors' of the Levite priests. Recall those monastic-controlled benefices which were sold as lay impropriations, or the disputes over tithes between Richard Culmer and his parishioners. The notion of paying a particular group of the clergy to pray or worship on our behalf is partly a variation on a tithe to support the Levites.

There are two aspects to the practice of tithing which can be explored here, though they are not intrinsically connected. One is the very notion of a debt to be repaid, an obligation to be fulfilled by paying one's taxes, by making an ongoing sacrifice, a developed version of contributing food to

the temple or the lord. The other is the concept of a percentage, a numerical proportion of one's assets which both indicates the amount of obligation and provides a measurable means of satisfying it.

One standard way of raising, or expropriating, revenues to finance the mediaeval state took the form of a 'levy' (note the word), often formulated in terms of a 10th or 20th or 24th of overall assets, to be paid over to Royal revenue collectors. Much of the statistical data we can reconstruct concerning the wealth of the general population and in particular of landlords and tenants is derived from the still extant records for the assessment and payment of state finances. The announcement of income-tax rates in a modern government's annual budget statement is almost as much a descendant of tithing as current tax evasion is an emulation of Cain's dissimulations.

The most significant and controversial use of a percentage rate was arguably that of usury, the penalties for borrowing and the profits from lending. The Wakefield Cain, in a comic prologue to the later action, assaults his servant but is responded to in kind:

> *Cain*] That shall by thi false chekys [*strikes him*]
> *Garcio*] And have again as right [*strikes him back*]
> *Cain*] I am thy master. Wilt thou fight?
> *Garcio*] Yai, with the same measure and weight
> That I borrow will I quite.

The quip about commensurate fisticuffs as requiting a 'borrow-ing' using the same scales, the same measure and weight, conjures up a commercial operation somewhat unlikely to have already existed among the second generation of humans: 'That I borrow will I quite'. But the issues involved were to have a long history, not least in relation to what was once called 'usury'.

usury

Some accounts of the 'transition' from mediaeval feudalism to early modern capitalism used to designate the changed role of usury as the linchpin of the new economic system, once the church's opposition to lending at interest was finally overcome, so enabling the legitimate development of extensive banking and capital investment. In practice, of course, as Canterbury's own financial records amply show, the practice of 'usury' was already widely prevalent, and we can easily cite instances of the Christ Church monks frantically borrowing from one Italian banker in order to pay off loan repayments imminently due to another.

Traditionally, the practice of lending at interest or 'usury' had been officially regarded as wicked, perverse, immoral, monstrous, sinful – sometimes even classified alongside incest and bestiality, with

excommunication as the proper penalty. One strand in the condemnation of usury was derived from the alleged prohibition of lending at interest found in the text of the Old Testament. Such texts could be variously interpreted, as applying only to those who were non-Jewish, so that Christians were bound to obey the prohibitions, providing one of the reasons why usury was associated in practice as well as in reputation with Jews. Different readings of these biblical sources permitted interest-bearing loans to be made by Jews to Gentiles but not vice-versa, or by Jews to each other, while New Testament citations enjoined non-Jews to make loans in which only the principal was repaid.

There were of course counter-arguments, citing the example of the 'parable of the talents' in which the servant is rebuked for not having even earned interest on the talents given into his care (Mt 25:14-30): 'Then you ought to have invested my money with the bankers, and at my coming I should have received what was my own with interest.' Predictably, Canon Law refinements and casuistical exceptions multiplied, while interest on banking loans flourished despite theological reservations and legal restrictions. An additional strand in the opposition to usury was derived from Aristotle's arguments concerning the procedure M – M', essentially that money insofar as it was used to 'create' more money, without resulting in a positive increase in useful goods, was a mis-use of the very nature of money, an unnatural offspring, a *tokos*, the Greek term for childbirth applied to 'interest'.

The 10% tithe required of the dramatised Cain and Abel was measured in physical units, 1 lamb in 10, 1 bushel of wheat. But especially in a calculation involving monetary units a 'percentage' can take a variety of forms. The tithe was one tenth of the overall produce, and could be regarded almost as a 10% interest charge on the value of the land. But the more valuable the land and its produce the higher the practical value of the tithe collected, so that any relation between the 'needs' to be met by the tithe system, such as providing sufficient for the 'Levites' and the overall value of the tithe itself was less easily calculable, more comparable to a flexibly adjustable rent on land paid by a tenant, as if the Levites were the direct owner or landlord rather than the beneficiaries of an overall social re-distribution. Moreover, the mediaeval ecclesiastical Levites, whether parish clergy or monks, were not themselves involved in any extra work for their increased tithe. They benefited even if a tithe-paying farmer had considerably improved the productivity of the land by his own increased hard work.

Some uses of a percentage calculation could thereby partly sidestep the issue of 'commensurability'. To adapt Aristotle's example, if the price of a house was set in terms of a higher or lower percentage of its previous purchase price, this still required a calculation of how many shoes more or less amounted to that valuation. But what of a payment charged by an intermediary for enabling or facilitating the transaction, for example by

lending money to one or other of the exchangees, perhaps even providing the M in C – M – C? The percentage rate or interest on a temporary loan could be based upon familiar justifications for both usury and share-holding. If I risk my own money in a transaction by lending to an entrepreneur or taking a share in a trading voyage, I could calculate my odds on making a gain or a loss by assessing my risk in probability percentage terms, based upon the estimated likely success or failure of the enterprise or voyage, which might then be correlated with what the deal could potentially earn or lose for me. Am I willing to risk, and at what odds, various possible outcomes?

Now consider a situation in which, say, a house is to be bought, but my intermediate role is neither to take shares in the transaction nor to lend the money to enable it to happen, but rather to facilitate the exchange by, for example, negotiating the terms upon which it will happen, perhaps including an expert calculation (however I claim to provide one) of the number of 'shoes' to be involved. Would it be appropriate to base my fee upon the total value of the transaction, or on the building costs of the house, or on the purchase price finally accepted, or according to the finally agreed number of 'shoes'? The claim that my fee should be based upon a percentage of the total value of the overall transaction effectively sidesteps the issue of how to calculate the 'correct' value of my own intervention. Which might for example include my conscientiously praying for its success. Percentage wise.

Now compare a related case. In a modern corporate takeover or merger transaction, is there a measurable relation, a commensurability, between a CEO's earnings and a decision to approve or reject a deal that is worth billions to the company? If negotiating the deal earns a fee, commission, salary, bonus, back-hander, how is the appropriate sum to be calculated? Currently, awarding a percentage of the overall value of a financial deal might be regarded as the accepted basis for a suitable remuneration. If a deal goes through which earns the company 100 million dollars, a certain percentage might go to the persons who negotiated, facilitated, or approved the deal. A million-dollar deal might 'earn' 1%, or $10,000, or $100,000 at 10% while a deal that is 'worth' $2 billion could 'earn' $20 million. Yet what justifies the higher figure, especially if the procedure of decision-making involves the same kind of expertise, knowledge, energy, know-how, etc., etc., and if the only substantial difference (some hundred times more) is the scale of the sums involved in the decision? In particular, what if the CEO or equivalent stakes nothing of their own money but would gain a percentage of the overall outcome by using other people's money, as investment or loan or guarantee.

The same kind of procedures can be seen operating throughout the extensive range of 'financial services' without which even the simplest of transactions involving money can no longer be easily undertaken in the current economic system, including a standard credit card percentage

charge. In so far as such prices, fees, charges, commissions, or 'bonuses' are 'fixed by men' it is an intriguingly widespread feature of the system that the agents (normally men) involved in 'fixing' the price are also those who decide what their own remuneration will be. One would surely have to be positively saintly to resist the temptations involved.

credo in credit

In some accounts, manufacturing capitalism has now been increasingly displaced or superseded by new forms of global financial capitalism, so that critical analysis has again focussed not on particular defects, such as insider share-dealings, bribes, scams, accounting scandals, or the endemic evasion of tax liabilities, but the very structure of the 'financial system'. The dynamic of the current global economy is regarded less as primarily shaped by the production of objects as by the role of investment services, banking, insurance, credit, mortgages, debt arrangements of various kinds, and, as Picketty and others have argued, the 'rational' choice of where to invest capital is often no longer in companies manufacturing products or even extracting raw materials but in financial institutions, themselves speculating in their own investments. The percentage returns are larger.

The linchpin of today's financial capitalism is no longer called usury, but is undoubtedly debt or credit, arguably another form of intrinsically 'unequal exchange' and at the same time an increasingly inescapable trap, partly akin to the unavoidable necessity of selling one's labour. The charges on credit card purchases have become an almost compulsory borrowing, in effect an imposed and almost involuntary interest-bearing loan, in which the rate of interest charged is exorbitant, with little substantial risk of overall loss by the lender, the credit card company. The 'intermediary' in almost all commercial transactions is now a credit company or bank, which charges an interest rate normally calculated in terms of a percentage of any transaction. There are other related 'services' to consider, such as digital 'platform' companies acting as the almost unavoidable intermediaries of the contemporary communications systems, with increasingly the power to 'ex-communicate' those not prepared to exchange private data for public connectivity.

A passage on credit cards from Anne Pettifor's *The Production of Money* (2018) can make the basic points:

> There is no money in most credit card accounts before a user begins to spend. All that exists is a social contract with a banker: a promise or obligation made to the banker to repay the debt incurred as a result of spending on your card, at a certain time in the future and at an agreed rate of interest. And when 'money' is spent on your credit card, you do not exchange the card for the products you purchase. This is because money is not like barter. No, the card stays in your purse. Instead, the

> credit card, and the trust on which it is based, gives you the power to purchase a product or service. It is the means by which you acquire purchasing power.
>
> The spending on a card is expenditure created 'out of thin air'. The intangible 'credit' is nothing more than the bank's and the retailer's belief that the owner of the card and her bank will honour an agreement to repay. As such, all credit and money is a social relationship of trust between those undertaking a transaction: between a banker and its customers; between buyers and sellers; between debtors and creditors. Money is not, and never has been, a commodity like a card, or oil, or gold – although coins and notes have, like credit cards, been used as a convenient measure of the trust between individuals engaged in transactions. So if a banker trusts one customer more than most others, they will be given a gold or platinum card. If a banker does not have trust in the customer's ability to pay, they will not be granted a credit card or may be given one with a very low limit. As a result, that customer will lose purchasing power.

We are back to issues of credulity. Pettifor does not specifically emphasise the role of credit card charges as a percentage of each transaction. The levels of interest can however move rapidly from being a loan with an interest charge, to a loan with a compound interest charge, to a loan with a penalty, and eventually involves the risk of exclusion from all credit facilities through a negative credit rating, combined with the intervention of rapacious bailiffs once the credit card loan is sold to a vulture company. All calculated in percentage terms.

There is no mathematical limit to compound interest, which means that beyond a certain point not only does an individual's debt become irretrievably 'unredeemable' but total global debt including sovereign debts (not least those on IMF loans) may so outstrip all future potential 'gross domestic product' that successive generations will have inherited not the dishonour of Adam's disobedience concerning a forbidden fruit but the asymptotic shackles of all future 'surplus value' being already assigned to debt-holders entitled to eternal returns based upon past investments in long-term 'futures', or 'inherited' loans undertaken decades previously.

The ongoing UK National Debt dates from the 18th century. As of March 2022 annual interest on UK government debt was £80 billion – comparable with the combined annual government expenditure on health, education, etc etc. One is reminded of the relation between total monastic income and that of the Tudor state. Admittedly, many current loans and 'futures' assets will be unreclaimable without further destructive effects upon global climate, so that whatever currency or coin such global debts are notionally to be paid in will eventually be as ineffectively void as a promise to be paid in prayers, since if no habitable planet remains, there will be no return on any investments at all.

A transaction involving purgatory and prayer could and did involve promises concerning eternity. That was the point of selling indulgences. The promised benefits were indeed infinite, though to enjoy the blessings of a plenary indulgence one had at least to get into purgatory first. That infinity was related to the alleged infinite merit of the saviour who had 'redeemed' our debt – even if with perhaps no compellingly palpable effect apparent as yet. If there was no end to time it was possible to purchase future time with no limit, as in a different model one can buy a day's portion of someone else's labour-time and keep the proceeds for ever. Being condemned to eternity in hell at least gave full employment to demons for as long as foreseeable. But our status today is that we have already been born into a global debt, involving the continual imposition of hellish daily pain, of incipient or actual famine, and not excluding the widespread shedding of blood. For Aquinas, the notion of the logical impossibility of any complete equivalence in a transaction involving the deity and the human race could only be resolved by 'grace', in the form of a 'jubilee', a divine forgiving of debts. Unfortunately, it seems that the IMF is precluded by its founding constitution from forgiving any debts owed to it.

'socially necessary labour'

It is time to emphasise a distinction made earlier**.** There are two main senses in which monks were 'paid to pray'. Requests were made for explicitly petitionary prayers, to gain some benefit during or after life, most commonly for a post-mortem existence hopefully in heaven. In a less specific way, monks were also paid to offer praise to the Almighty, prayers as acts of worship rather than petition. The defining form of petitionary prayer was endowing a chantry priest to pray for the soul of a specified donor. Such were, if you like, the micro-transactions in the divine economy. Whereas the 'macro' form of the monastic prayer economy was the collective performance in the choir of the liturgical offices, though the two modes could be conjoined, as in a monastery exclusively dedicated to praying for the soul of its founder. It was theologically possible to reject the notion of petitionary prayer for 'souls in purgatory' while still endorsing the activity of prayer as worship, retained in the endowment of a national clergy.

There is a standard account of how such prayerful activity fitted into the larger social formation. In a 'feudal' system the surplus generated by primarily agricultural production was partly diverted towards sustaining three social functions regarded as essential: that of the aristocratic fighter and that of the clergy, with the third function, that of government administration, to some extent shared between the personnel of those other functions. The dissolution of the monasteries arguably weakened one element within the social structure, furthering a transition from feudal to

capitalistic society. In Marx's terminology, professional petitionary praying was no longer 'socially necessary labour' even if the 'Levite' function was still partly operative.

It is possible to argue that both forms of prayer rested upon false premises, that not only did a posthumous purgatory not exist but neither did the God to whom praise and worship was offered. In which case the effective contribution of an act of prayer to any activity other than itself was wholy null, except insofar as a mistaken belief in the efficacy of prayer motivated those who prayed and donated. The Protestant reformers largely rejected the premise of purgatory, thereby undermining perhaps the most popular mode of petitionary prayer itself, while the later problematisation of the very notion of a receptive divinity could only regard 'prayer' as a form of affective personal behaviour. It was also possible to reject the theological justifications of the religious system while transforming some structural features of that system into an apparently very different one.

So : one equivalent function today of the prayer-peddling monk could be seen as that of the pervasive 'financial adviser', including what we more generally call 'economists'. The economic 'theories' and advice which can shape policy decisions by governments and companies as well as by individuals, may frequently appear to have as much theoretical coherence as a belief in the efficacy of prayer to diminish a purgatorial sentence. Partly because, even when presented as impressive mathematical models or formidable equations, not only do such models frequently not work 'in the real world' of rapid multi-factor and over-determined changes but the impact of their attempted implementation, not least upon other economic practitioners and policy-makers whose own preferred 'economic theories' are different, creates complex feedback processes which are frequently not predictable within the preferred systems themselves. However, it may not be all that important whether the theories actually 'work'.

From one viewpoint, what the mediaeval clergy, particularly the religious orders, were primarily 'paid' for was not so much to pray as to make prayer itself seem apparently indispensable to any social process, a necessary accompaniment and contribution. This decidedly peculiar activity of 'prayer' proclaimed and manifested the function of praying as an intrinsic component of the entire social structure, including its differentiated roles and hierarchies. That was a function well worth subsidising – until its growing incompatibility with other components of the overall economic and socio-political system became apparent over such matters as contested levels of ideological authority (monarchy versus papacy), the legitimacy of interest-bearing loans, or the criteria for a 'just war'. And even the distribution of wealth itself.

We might therefore return to a semi-facetious or polemical mode and suggest that what has evolved as a replacement for the 'prayer' sector of the mediaeval economy is obviously today's 'financial sector', in which professional practitioners are, similarly, not paid a 'wage' since no

intrinsically valuable commodity seems to be produced, nor rewarded with a coherently determined 'salary' since fees and costs are essentially arbitrary, though 'bonuses' are generously 'fixed by men', even while no clear quality assessment procedures can be plausibly related to objectively measurable results.

Particularly in the burgeoning business of 'consulting' in the 'micro' professional 'financial services' industry, including 'advice' on pensions and savings, the difficulty even of keeping up-to-date with Financial Conduct Authority lists of probably dubious firms is now almost as problematic as choosing a patron Saint to pray to. One can always ask for expert advice or an economic analysis, but from which expert or economist? Add the need to check price comparison websites, the un-reliability of possibly false reviews on trade platforms, the pervasive sense of possibly participating in collusive tax and price 'adjustment' arrangements, tied commissions, *baksheesh*, 'premium payments', and so on. The potential profit margin for offering 'expert financial advisory services' has no (percentage) limit other than the resistance of consumers to patently exorbitant charges, and providers can asymptotically exploit those 'lay' customers who 'don't count', especially in the literal sense, and can thus be expertly bemused. As for occasionally choosing between competing electoral economic programs at the 'macro' level of analysis and policy, even conscientious fact-checking seems of little practical use for assessing future policy implementations.

One almost amusing aspect of this postulated parallel between professional purveyors of prayer and financial advisors or professional economists is that each is in a position to justify their own charges or fee by at least indirectly basing their claims upon their own respective theological or economic theory, even though in each sphere such theories are intrinsically unprovable – partly for logical reasons (Aristotle's *aporia* or the tricky problem of immutable divine will) and partly because such theories are not empirically or practically validatable or even retrospectively falsifiable.

One can't definitively cite a miracle as specifically attributable to a particular prayerful intervention, while economists can't exactly repeat an experiment of implementing some theoretically-supported economic policy, or plausibly claim credit for their contribution to changes in overall economic performance when dealing with the shifting complexities of a whole global economy. In effect, for certain kinds of job the remuneration of the people who practice them is decided by themselves, not by some intrinsic value or even by the market, and in practice cannot easily be directly challenged. It is an unwise client who disputes their lawyer's fees or their tax-adviser's calculations of their own charges.

Few interest groups can see themselves as significantly providing a connection between their own input, whether prayer or policy, and the fate not only of individuals but of a whole society, even perhaps the planet itself. A prayer commissioned by a single individual, such as a monarch or

Emperor or Pope, may once have been supposed to influence not only that individual's fate but a national or epochal development. Not least because such an individual's unjustified belief in the efficacy of their prayer or economic advice may itself become a factor in such developments. Putting us all, perhaps, in their debt.

grace

At this point we should go back to the discussion of 'grace'. One contentious issue which loomed large in the Reformation disputes was the question of the point at which grace 'enters' the 'divine economy' for an individual believer. From Augustine's critique of Pelagianism onwards, the dominant theological tradition had insisted that without 'grace' no 'salvation' was possible and that it was God not man who initiated the granting of grace. Which meant, in one interpretation, that no natural human activity, however meritorious, could itself constitute or deserve the 'gift' of grace. Such a position could be seen as leaving an individual in a somewhat circular impasse: without grace one could not be given grace, and unless one was already 'full of grace' (as in the Ave Maria salutation) one would remain grace-less. For some, however, God's gracious gift may already have occurred even before birth, according to various notions of predestination.

Alternatively, the granting of 'grace' could take the form of a gradual increment, perhaps extending into a posthumous process of purgation. The characteristic Scholastic approach to the problem was to analyse and differentiate, between 'first grace' and 'second grace, 'prevenient grace', 'habitual grace', 'salvific grace', and so on. The entry on 'Grace' in the schematic index to Denzinger is worth consulting. One Protestant emphasis was to locate the decisive intervention of divine grace as occurring in a moment of individual 'conversion', of personal transformation in an act of faith, a 'born again' decisive experience. Both positions in effect evaded the *mise-en-abyme* problem, as the parallel issue of the original 'fall' was similarly left unresolved by displacing Adam's decisive disobedience onto a satanic intervention, itself eliding the problem of how a good angel had ever become an evil angel, or how and when 'sin' itself had ever 'entered' into the world

Now compare the problem of 'value'. If an economic system or an economic theory regarded as appropriate to that system is construed as revolving around the notion of 'value' ('value for money' claims), one question almost parallel to that of the theological conundrum is: at what point does value 'enter' the economic system. As we have seen, there have been broadly speaking two divergent responses to this question, though it would be unhelpful to characterise the answers as reflecting catholic and protestant tendencies.

The currently dominant 'neoliberal' position locates value as in effect constructed at the point of exchange, almost a form of 'conversion': the momentary balancing of supply and demand, or final agreement between buyer and seller, takes the form of and constitutes the instantaneous market or share price, based not upon some intrinsic or essential attribute of the commodity which is being exchanged, though considerations of the seller's costs or the buyer's intended use might be taken into account in the negotiation or calculation. That 'account' is, however, to be 'measured' in terms of 'money', which can take a number of forms as both the medium of exchange and the measure of value.

What then has to be 'accounted for' is how 'money' itself can be regarded as instantiating 'value' in the first instance, how it too 'entered' the system. Which may lead one in the direction of several different claims, about the scarcity of gold or the role of sovereign state guarantees, the function of fiat money, or the possibility of cyber-currency 'minting'. How 'money' can perform this complex of functions has become the subject of disputes not unlike attempts to explain the origins of grace, but now without resort to anything more divine than a hidden hand.

On the other hand, as it were, versions of classical economic theory have tried to locate value as, in effect, occurring 'outside' the act of exchange, since what is exchanged 'already' has in some respect an in-built 'value', somehow embodying the value which is to 'enter' into the process of exchange. In this kind of account, it may be land and its natural products which underpins exchangeable commodities, or it may be the incorporation of labour, as energy and time, which transforms inert matter into valuable commodity. Which then pushes the question further back into explaining the process whereby land or labour can have already taken on the 'form' of exchange value, and in particular at what point money has 'become' the medium of any such 'exchange' of 'value'. If money is regarded as providing the equal units of measurement in an exchange system, are there 'units' of land or labour which can 'already' be related to monetary units 'prior' to a market exchange? And in particular does the 'market price', especially of labour, somehow distort the postulated 'natural' or 'intrinsic' value generated by land or labour?

Faced with these alternative accounts, at some point does the one system of economic explanation flip into the other system – perhaps almost a kind of 'conversion' from one belief structure or 'theory' into its apparent opposite, a circular process in which market price dictates the value of labour which underpins exchange value which constitutes the market price. We are back at Aristotle's *aporia*.

unequal exchanges

But can there be some third possibility, perhaps even one partly suggested by investigations into the odd economic character of paying a price for

prayer. Calculating the market price of a prayer or calibrating the intrinsically valuable components of a prayer-full hour (or the monastic 'hours') seems unlikely to shed much light on the nature of money or the measure of value, but in the spirit of this thoughtful wandering around this extraordinary building, partly built upon the profits of prayer, allow me briefly to offer another meandering re-cap into the history of economic thinking, from yet another perspective.

As we have seen, the core problem of 'economic theory' as indicated by Aristotle's initiating analysis and argument was that of 'incommensurability', that a specific 'use' is not directly commensurable with or measurable against some other use and that the exchange of 'commodities' cannot be calibrated in any more scientific or rigorous way than by the oscillating and unstable procedures of 'the market', itself a shifting amalgam of speculation, anticipation, gambling, and power relations, which nevertheless apparently constructs some workable 'commensurability' through the accepted practical 'measurability' of money.

Yet, as Marx passionately insisted, there nevertheless has been a continuing perpetuation of systemic inequality, an ongoing enormous disparity, an uneven distribution of income and wealth, which seems intrinsic to the workings of the economic system as a whole and which therefore requires systemic explanation.

Both major forms of theoretical response to the issues seem finally to pivot on the conception of 'money' (or perhaps 'capital') as the way in which, in everyday practice, an imprecise but measurable commensurability is actually arrived at, by accepting a calculation in monetary units as the numerical mode in which the measurement of the exchange is itself accomplished. This 'working solution' or hypothesis, as Aristotle might have described it, rests upon regarding money as providing a shared measurement of value, an agreed medium of exchange, capable at least of being subject to some form of measured regulation and even in certain contexts a basis for enforcing a supposed 'fair' or just 'price', despite the position emphatically endorsed by John Locke and others that the actual movement of market prices is not susceptible to effective regulation, still less to state planning which also has to be organised on some basis of a reliable measurable medium of exchange and store of value, a version of mathematically calculable units of money. And so on.

What if, however, such theories are misleading precisely in so far as they endorse the notion that 'money' provides relatively reliable and measurable, or even temporarily 'fixed', units in which commensurability can be achieved in any particular exchange. Aristotle acknowledged that some forms of 'money' (gold and silver for example) are less 'changeable' and more 'stable' than other possible media of exchange, while recognising that, for example, the ratio of exchange between 'foreign' currencies can fluctuate and that the buying power of money units may change over time, as in the case of 'clipped' coins or what is now called inflation.

Yet it can be argued that the money which 'enters' into any actual exchange of commodities does not in fact provide 'equal units' in which the exchange can be calculated but is itself 'already' characterised by a prior non-commensurability, a lack or absence of measurably equal units.

Again, this is not dissimilar to the problem of defining the point at which grace 'enters' the divine economy for any individual, and also a variation upon Marx's notion of an intrinsically 'unequal exchange' involved in that core act of conversion, the use of one's labour-power negotiated for an agreed wage. Yet any exchange between buyer and seller involving money as the medium of exchange entails as a precondition that for both sides of the transaction the money involved already 'has a value', including any actual money which is transferred from buyer to seller. Which means that the buyer must already have, in some form, the money which is transferred and which the seller is willing to accept as the due form of value involved in the transaction.

When a bank-note is handed over at a market stall both buyer and seller are supposedly dealing in 'the same money'. Whatever form the bank note takes or however large the market. Which is the logical premise of commensurability. Yet the value of that money is not necessarily the same for each participant. For an obvious but often discounted reason. One might here recall Mark 12:41-44: "Truly I say to you, this poor widow put in more than all the contributors to the treasury; for they all put in out of their surplus, but she, out of her poverty, put in all she owned, all she had to live on."

If the commodity in question is priced in an agreed exchange at ten pounds and the buyer's income is, say, fifty pounds a week while the seller's usual income is five hundred pounds a week, there is a sense in which the commodity has cost the buyer a fifth of the buyer's income while the monetary benefit to the seller is only one per cent of the seller's income. Conversely, if the buyer has an income of five hundred pounds a week and the seller a weekly income of fifty pounds the 'value' of the agreed 'price' will again not only look rather different for each but will in practice be so. This is not just a sleight of hand, or a merely notional accountancy problem. That difference can be viewed from several angles or aspects.

Both participants may well accept the agreed ten pounds as a 'fair' price, even if the 'value' of that ten pounds is arguably quite different for each, not because of an intrinsic disparity to be somehow scientifically located in the composition of the object itself, or a specific disparity to be analysed in terms of a necessarily exploitative character embedded within the particular exchange procedure itself. Nevertheless, the disparity in income makes the agreed price an 'unequal exchange'. In that respect the value of my money is not the same as the value of your money, and again is not commensurable.

In a money exchange what makes the exchange equal or unequal is not the labour which went into the the manufacture of the commodity, the exchanged object, but the labour which went into the exchanged money

and thereby into any previous unequal 'cost' of that money. At its simplest, how much it has already cost each exchangee. Not that this 'solves' the issues either.

But as we will see, Aristotle's original argument was that a 'mathematically' commensurable exchange necessarily involved at some stage of analysis an equality of the buyer and seller, an equation in which it is the cobbler and builder which have 'equal value', according to the same unit. Which involved the entire structure of the *koinonia*, the community.

At issue is the consolidation of an ongoing in-equality 'already' generated by the workings of the economic system as a whole. Not least by the pervasive role of percentage calculations touched upon earlier, for example by defining inflation or an increase in pensions or a decrease in taxation in terms of a *percentage* figure related to the *already* existing distribution of income, wealth, and expenditure, and frequently thereby serving to perpetuate ongoing and inherited disparities. Particularly when a wage increase is merely calculated as a percentage of the previous 'agreed' wage level. As with the point of entry of 'grace', the *mise en abyme* involved can be traced primarily through a history, not least of accumulated debt, of inheritance and dis-inheritance or expropriation, of tax evasion and criminal exploitation, indeed a partly mythic history most selectively narrated by those who benefit from its transmission.

To an extent, the virtual pooling of the combined incomes of a collective such as a trade union may help redress a local negotiating imbalance, a coordination rather more difficult to organise in relation to income and wealth disparities related not only to 'class' but to gender, race, and age. We could here return to issues concerning 'house' and 'house-hold' by highlighting the levels of 'pay', or lack of income, associated with so-called 'house-work'. Compared, say, with the amount paid to a company director, a government minister, a lawyer or accountant, for an hour of of their peculiarly valuable time.

Marx might quite properly propose the notion of 'socially necessary labour time' in relation to the abstract 'average time' required to produce a particular commodity, and therefore as a factor in his analysis of the measurement of 'labour time' as the basis for the crucial struggle over wages. But the application of such a theory to 'house-cleaning' or 'care home employment' has been, historically, to say the least, somewhat flexible in sectors categorised as primarily women's work. It is not necessary to track far into the analytical entrails of wage labour calculation to compare the control over income levels exercised by, say, white male plantation owners as against black female cotton pickers.

From that perspective, the compelling account in *Capital* of the long historical struggle for an eight-hour day is as central to Marx's analysis as his attempts to make analytic sense of 'exchange value'. Not least because it indicates that notions of economic predestination, of the alleged inevitability of economic disparities, of class pre-determination, are as

theoretically inadequate as their theological counterparts, though it may be little comfort to recognise an extended purgatory as a shared implication.

Interestingly perhaps, that mild form of individual 'conversion' known as discovering one's 'vocation' to be a priest or monk or nun provided one of the few mediaeval avenues for an almost voluntary, and peculiarly random, decisive redefinition of one's own 'class', whether the wealthy Francis and the aristocratic Aquinas unexpectedly foregoing high social status, or a peasant's son becoming an Archbishop of Canterbury, a defiance of assigned fate rather more common than paupers marrying fairy-tale princes or princesses.

One significant passage in Aristotle which has notoriously puzzled commentators and defeated translators was his exposition of what he indicated as a four-sided diagram, relating a cobbler and a builder, shoes and a house. Aristotle offered the diagram as a help towards trying to make clear the mathematical equation involved in an exchange of so many shoes for a single house. For the overall equation to produce any cogent figure for the number of shoes involved, Aristotle had to make at least two terms in the quadruple relation 'equal' to each other, for example that the cobbler has to be regarded as equal in units to the builder, so that the transaction could involve two arithmetically equal factors. Aristotle's exposition of this diagram may involve somewhat idiosyncratic maths and in any case, as we have seen, Aristotle eventually concluded that no mathematical equation or commensurability between shoes and a house can be scientifically or rigorously arrived at. But what apparently baffled his Victorian translators was the very notion that a cobbler might have an 'equal' status with a builder (especially if translated as an 'architect').

By way of contrast, when Archbishop Albert of Mainz, issued his *Instructio summaria* in 1515, castigating Luther and justifying indulgences, he recognised that if people were not to have equal status, wealth, and income, there should not be a fixed ratio between monetary donations and the number of days to be remitted in purgatory, but rather, blatantly and explicitly, that different monetary contributions were to be peremptorily demanded of different social and ecclesiastical ranks in exchange for their individually calculated purgatorial exemptions. He provided a detailed tabulation, in accordance with Vatican stipulations:

> Concerning the contribution to . . the building of said church of the chief of the apostles, the penitentiaries and the confessors are to ask those making confession, after having explained the full forgiveness and privilege of this indulgence: How much money or other temporal goods they would conscientiously give for such full forgiveness? . . Because the conditions of men are many and diverse, it is not possible to establish a general fee. We have therefore fixed the following rates:

> Kings, queens, and their sons, archbishops and bishops, and other great rulers should pay, upon presenting themselves to places where the cross is raised, twenty-five Rhenish guilders.
>
> Abbots, prelates of cathedral churches, counts, barons, and others of the higher nobility and their wives shall pay for each letter of indulgence ten such gold guilders. Other lesser prelates and nobles, as also the rectors of famous places, and all others who take in, either from steady income or goods or other means, 500 gold guilders should pay six guilders.
>
> Other citizens and merchants, who ordinarily take in 200 such gold florins, should pay three florins.
>
> Other citizens and merchants, and artisans, who have their families and income of their own, shall pay one such guilder; those of lesser means, pay only one half. . . .
>
> But those who do not have any money should supply their contribution with prayer. For the kingdom of heaven should be open to the poor no less than to the rich.

It was a policy which might be regarded as a papal form of progressive taxation. Though prayer, on this reckoning, was regarded as effectively value-less in monetary terms, even if of infinite spiritual worth.

It may be that both marxist and monetarist or neo-liberal economists can offer differently persuasive or ideological accounts of the more or less 'satisfactory' or morally (un)acceptable and contradictory workings of the capitalist economic system. What is clear is that being content to categorise an economic system as being inevitably made up of the 'poor' and the 'rich' is not itself an explanation but what has to be explained, primarily through tracing the historical perpetuation, reproduction, replication, of that difference by the use of both political power and weaponised 'economic theory'. Whether one can 'systematically' understand or historically account for that system is of course a different issue from whether one can change it. But again it may be worth, once more, considering the monastic economy with that question in mind.

transition

My working premise for trying to 'understand' the very nature of a prayer-based monastic economy has been that the object of that prayer was a form of illusion, most basically that, if God does not exist, any prayer activity directed towards him is an empty exercise. Even in a traditional theological perspective, since God is immutable and therefore his decisions cannot be changed, any act of prayer which seeks to influence the divine is peculiarly otiose, and petitionary prayer makes little theological sense. One traditional conception of such prayer was therefore that the activity of praying changes the person doing so, not the God to whom the prayer is addressed. It

would then, however, seem distinctly odd that one would pay somebody else to pray on one's behalf : an activity whose essential function is to change oneself can hardly be implemented through a vicarious, delegated, or surrogate activity by somebody else.

The further question that now intrigues me is whether considering the monastic economy as based upon this empty or hollow activity of praying can help to illuminate a possible transition, that from the present mode of capitalism to some different form of economy and society. Antonio Gramsci once remarked that one way to envisage a post-capitalist system is to consider the resources of pre-capitalist formations. How might thinking about monasteries help explore some alternative economic arrangements to those of the present?

From one perspective, after all, the monastic orders can be regarded as having been precursors of today's wealthy corporations. The trans-national organisations of both monks and friars had some affinities with modem global companies, not least the capacity to recruit and train highly skilled practitioners from across a wide range of countries and classes and to deploy them wherever and whenever the corporate body had need of them. From the days of Augustine himself, once the abbot of a Roman monastery, through Theodore, a Greek from Tarsus, to Lanfranc and Anselm, both Italians based in Normandy, the archiepiscopal throne of Canterbury had several incumbents from 'abroad', drafted in as required by the international concerns of a Roman headquarters. As with the corporate strategists of today, the community of Canterbury Cathedral might put the long-term prospects of the international Benedictine Order above merely personal or local and short-lived considerations. Their investments in land and trading rights served a long-run consolidation, with one enabling factor the imposed celibacy of the monks as individuals – not that a degree of sexual activity might not occur, but none that overtly threatened to dissipate the ongoing inheritance of the collective community as a body of shared possessors. While marriage and therefore direct family inheritance was ruled out, an unacknowledged son or favourite 'nephew' might well benefit from a monastic 'patron', but any deflection of substantial corporate assets into a mere family dynasty was liable to be aborted. The celibate culture was partly to prevent any such development.

One might also see a precursor of current corporate competition in the sustained struggles between the various monastic orders, and even between monasteries of the same order, the Benedictines of Christ Church pitted against the Benedictines of St Augustine's, or the flourishing new Cistercian foundations ranged against the declining fortunes of the Black Monks, and the fierce struggles for intellectual supremacy between opposing Dominicans and Franciscans, competing in every university establishment in Europe. This aspect of corporate competition perhaps has more in common, as Gramsci also suggested, with the ideological combat of modern political parties. Rather than align transnational monastic

communities with capitalist conglomerates, it is at least as plausible to see them as anticipations of those mass political organisations whose members were (once) profoundly committed to a set of principles and intellectual positions which they sought to proselytise and to implant in the wider society, against the differently preferred programmes of other but basically similar organisations. A struggle which all the competing monastic orders in England abruptly lost in the 1530s.

One view of large-scale socio-economic change has it that such transitions do not primarily take the form of a sudden crisis or upsurge, though moments of transformative violence may occasionally figure in history, but that, for example, there was a slow accretion within the feudal system of emerging capitalist elements which eventually led to an almost inevitable transformation. The most recent detailed and authoritative book on the dissolution of the monasteries, by James G. Clark (2021), seems almost to argue that the extensive lands and other assets of the monasteries were already in effect in the hands of the lay agents who would take complete possession of them by a kind of incremental transfer, a historical thesis not unlike recent revisionist accounts of the Islamic conquests as largely a recognition and affirmation of a transfer of power which had already occurred in the handover of administrative control of the dying Roman Empire to local Arab leaders. On this account, the actual closing of the monasteries themselves was hardly 'one of the most revolutionary events in English history'.

Certainly, it is implausible to regard the dissolution in classic 'revolutionary' terms, with the monks as an exploited underclass, still less as a waged proletariat, as we have seen. One notion of 'revolution' emphasises what Marx called class conflict, as waged between socio-economic groupings which are themselves both the products and the structural components of the economic system, so that on Marx's analysis of 19th-century capitalism the core process of the sale of labour power results in classes whose interests are essentially opposed within that 'exchange'. It has been the struggle over and within that unequal relation which increasingly shaped the dynamic of post-feudal history, and it is the continuing victory of one class over another which constitutes the unfinished history of capitalism. For Marx the political victory of the working class could institute an abolition of that 'unequal exchange' relation and with it the distinction into the particular classes which had been the foundation and process of conflict within capitalism. This was not to claim that in a 'classless' society so defined there would not be other forms of inequality or oppression but that the historical shape of the future would not be in the same way determined by class conflict.

However, a different notion of transition is also to be found in the writings of Marx, one that could be characterised as a dual economy model. As in a political crisis there might be a dual power situation where control of the state is contested between two nearly matched opposing forces, so an

overall economic system might be structured not only by class conflict but by a competition or conflict between two different economic modes existing in the same moment and struggling for dominance. It then matters which of these overall models of historical change shapes an attempt to think of any transition between the present economic system and a future one. One could accordingly indicate two directions to explore, distinguishing between what might be broadly regarded as the 'use' direction and the 'exchange' direction, which may not wholly preclude each other.

A third Gramscian comparison might also be made. If monastic communities were both a 'type' of capitalist corporatism and precursors of the political party, they can also be seen as anticipatory versions of what today might be regarded as alternatives to both: the utopian commune. Thomas More's *Utopia* dates, after all, from 1517 and he too was a victim of Henry VIII. Some utopian extrapolations might be appropriate.

half-formed

So, let us for a while pursue some more 'half-formed thoughts' prompted by thinking askew about a monastic economy. A monastery was not a normal ruling-class household based around a family and the inherited ownership of family assets, but rather a voluntary association which explicitly excluded familial relations and the generation of dynastic offspring while emphasising collective responsibility and a requirement of shared 'poverty', a term to which we can return later. Leaving aside the issues of celibacy and gender, there are at least some affinities with recent 'alternative' communes.

The sharing of basic levels of subsistence, the distributed labour in agriculture or scriptorium, the cycling of administrative tasks between brethren, the voluntary subordination of personal initiatives to the collective direction of the whole community through an elected leader, who after a term of office could return to the lowest ranks, the co-operative responsibility for maintaining both material fabric and spiritual or cultural life – all these might seem attractive features for those seeking to escape from currently repressive forms of individualist consumerism, or to establish alternative ways of living from the standard domestic household. That the accumulated wealth, in its various forms, of the monastery's Treasury was collectively owned and managed is not the least of the apparently 'alternative' aspects of this socio-economic model.

We can also, to an extent, think about the monastic community as a kind of medium-scale cooperative enterprise or even a 'maker' workshop. Though monks did employ others to do a variety of tasks on their behalf, a monastic community was originally intended to be effectively self-sufficient. From the beginning, the monastic rules included an element of manual labour by all monks. Whether it was a matter of farming the community's

land or building an extension to the chapel, cooking for the whole community or doing the laundry, looking after the sick and elderly in the infirmary, or providing food and shelter for the poor or the pilgrim, these were all activities undertaken, according to the Benedictine Rule, at least partly by the monks themselves, with no direct 'payment' to the individuals concerned. In addition, it was most often the case that the skills and knowledge required for these various tasks were systematically passed on from one monastic intake or age-group to the next, and quite substantial responsibilities were allocated on the basis of a gradual 'in-house' mastering of the skills required. It was built into the monastic rules concerning 'obedience' that in principle almost any of the brethren might be called upon to perform any of the functions required for the maintenance and continuance of the community as a whole, including the role of Prior or Abbot.

One instance is again the work of the scriptorium – and copying manuscripts was manual labour involving considerable physical effort. The assumption was that if the community required the use of a text it would be copied by a member of the community, whether by travelling to another monastic library or by transcribing a volume already possessed by or loaned to the home community. In a society in which literacy of the most basic kind was limited to a very small minority, it is noticeable that the work of reading and writing the sacred text was assumed to be within the eventual reach of almost anyone taken into the community. It was presumed that almost any recruit entering the monastery from whatever previous educational or class background might be encouraged to learn Latin, perhaps Greek, and maybe even Hebrew, as well as studying philosophy and theology, as a possible part of their long monastic education The fact that the scriptorium was primarily devoted to the copying of texts introduces a related motif worth exploring.

We can now make copies of texts almost instantaneously, including simply by saving a word-processed document in one or several versions. We can download an enormous range of digitised texts from any number of sites, can scan any printed book as an editable text, and download or copy music, sounds, images, plans, diagrams, videos, et cetera. Increasingly, we are also able to digitally copy or reproduce three-dimensional objects. Many of these activities can almost be regarded as free of charge, as having minimal 'unit price'. Leaving aside the issue of copyright, the cost of making an additional digital copy is to be 'measured' in processing and storage capacity, not primarily or directly in any monetary cost over and above owning or having access to the required computing apparatus.

If Marx's analysis is partly correct, that the core process of capitalism lies in the unequal exchange of selling and buying wage labour, then an element in any alternative might include a form of production without directly paid or 'waged' labour at all. If the core process by which capitalism generates and sustains an inequality of wealth and income is still to be located in the

production of a localised surplus through the exchange of labour power for a determinate wage, then one avenue towards at least modifying that unequal accumulation could be an alternative form of transaction at the centre of the manufacturing process itself. If the problem lies in a production system geared primarily towards the creation of 'exchange value', then production directly of 'use-value', for actual use by the producers themselves, without the apparently necessary concomitant of an exchange system, could be pivotal.

One established way of formulating such an aim has been in terms of collective appropriation of the means of production, but arguably technologies, at least, have moved on. It was a characteristic feature of the capitalist manufacturing system that the processes of work, of producing objects of 'use-value', were institutionally distinct from the exchange process, in the form of retail buying and selling, with the factory typically separate from the high street shop. More recent developments have potentially dissolved those structural distinctions.

A contemporary version of a local community 'work-shop' might be constructed, through the provision of relatively small-scale production facilities, where in effect either individuals or groups could learn to make a wide range of 'needed' objects for themselves, with the assistance of programmable machine tools and digital templates. In particular, many of the normal 'household' items, from furniture to kitchen appliances, could readily be manufactured as required, a version of 'production on demand' already familiar from POD printing and publishing. How this micro-level alternative to production for exchange might itself be financed would raise questions concerning the allocation of public resources and overall taxation and investment policies, but these are problems not in principle radically different from those which once governed the provision of local council housing.

At a more 'macro' level one can envisage complex production organisations not necessarily localised but interconnected across variable distances, deploying the coordinated use of fully automated robotic manufacturing, with just-in-time production and distribution activated by online purchasing of products on demand, with supply chain and distribution dependent primarily upon digital downloading, and deploying where possible composite flexi-material for digital printing at the point of manufacture or purchase or end-use. If 'print on demand' products were only activated by specific orders the required 'supply' would indeed match demand, provided circulation costs were minimal and end-distribution digitally immediate. Such an overall economy might also utilise some form of household 'fridge farming' or back-yard gardening as the basis for dispersed subsistence agriculture, possibly based upon nano-tech agriculture, including genetically modified crops able to flourish in hydrographic or other minimalist environments. Recent speculations along such lines have focused not only upon 'automated luxury production' but

the possibility of 'Walmart planning', based upon network data flows and possibly the application of dispersed AIs to coordinate new forms of 'exchange accounting' and 'surplus production' on our behalf, while we play or 'work upon ourselves' – or perhaps even pray. Or read and write long books.

A Protestant emphasis upon praying for oneself and post-capitalist 'producing for oneself' might offer a certain parallel, not least because praying on one's own behalf was an activity which could never be effectively prohibited, and was always a basic component of the overall religious system. In the same way, producing locally 'for oneself', whether for individual, family, or community, has been a persistent element within any economic formation, even if increasingly marginalised in the overall movement from local subsistent agricultural production towards today's globalised supply chains, including the interposition of often enormous physical distances between producer and consumer rendered almost invisible by the procedural immediacy of online shopping. A 'do it yourself' element has often figured in alternative economic models, from Robert Owens to 'worker control' to hippie communes.

However, all such quasi-utopian speculations may be both mildly persuasive but also highly implausible as retrospective comparisons romantically projected onto any actual mediaeval monastery. If we still sometimes picture monasteries as already alternative communes, we omit from the landscape those serfs and tenants who provided the labour, rents, and tithes which brought in considerably more regular and reliable income than the pious donations to the shrines or the chantry stipends which funded the murmuring of prayers and the celebration of masses. A large land-owning monastery was almost inevitably a major exploiter of labour-power, and Canterbury Christ Church was among the largest. That some accounts depict the Christ Church monks as enjoying 13-course meals on liturgical feastdays while devoting only a small percentage of the overall income to the poor at their gates does not seem wholly compatible with the third monastic vow, that of poverty. On the other hand, other sources cite a deliberate and constant over-production of food crops so that around two hundred poor could be fed by the almoner every day.

For a while, perhaps the newly-formed Dominican and Franciscan friars steered clear of such established Benedictine perils, but the begging that originally sustained the mendicant orders was itself extracted from the surplus of a society that too often had too little to spare – which would return us to the issue of precisely what was being paid for, whether by self-interested lordly patrons or by generous poor or credulous pilgrims. Any comparison with a Gramscian political party might be wryly reinforced by claims that even the friars were inexorably transformed into bureaucratic organisations designed for feathering their own nests, or by emphasising the figure of the street-corner preacher, begging-bowl in chilled hand, tattered message waving in the wind, seeking forlornly to implement an impractical

schema, a clear precursor of the committed activist selling unwanted newspapers outside factory gates – neither of which is quite what Gramsci had in mind.

Elements of this comparison could however merit some further probing. First, that the religious orders sought in their own mode a fusion of theory and practice, of intellectual and manual labour, and, second, that in a crucial respect they did indeed embody a fundamental challenge to the social and economic structures in which they lived, and that these two aspects taken together might still be seen as comprising an intrinsic alternative not only to their own day but in ours. Though perhaps not quite in the way they themselves would have envisaged that challenge. We can speculate a bit more about prayer, poverty, and digital possibilities.

digital economies

Can we think of a prayer-based economy not only as akin in some respects to the current financial services sector but also as a 'type', an anticipatory model, of a still developing digital economy? Obviously, we could no more live on prayer alone than on finance alone, and the digital domain, though it can already supply a range of quasi-objects, such as music, texts, games, and entertainment, cannot provide the basic material necessities of food, shelter, and energy. Yet that oddly immaterial activity of prayer could once have been directly offered in exchange for such undoubtedly material goods as farms, buildings, livestock, mines, etc., creating considerable wealth for institutions explicitly ruled by a commitment to 'poverty'.

In the intense struggles within the Franciscan order, the fiercest debates revolved around the very definition of 'poverty' and in particular the distinction between 'possession' or 'dominion' and 'use'. Normally, the effect of an 'exchange', including a transfer in the form of a free gift, is that at the end of the procedure one person may not only use but now owns what the other person had previously owned. The transfer of ownership and right to 'use' could be exclusive or partly shared. However, according to a strict interpretation of the Franciscan rule no Franciscan could own anything at all and was also debarred even from using money. If so, what was the status of donations made to the order, including land, churches, and even small cash offerings?

At stake was the claim that Jesus and the disciples had owned absolutely nothing and implicitly that 'the church' should therefore entirely divest itself of its wealth and properties. One solution to this Franciscan issue had been for legal possession of any such assets to be assigned to the Pope himself who then permitted individual Franciscans or communities to make use of them, even if, as in the case of food, the 'use' involved complete consumption of the item. Such distinctions are already familiar: a book can

be borrowed from a public library to be used for a specific length of time but no transfer of ownership is involved.

However, the online Internet Archive, for example, is not just a borrowing library. When I download a 'public domain' text I own it, but this is no longer an exclusive ownership. Digital copying can now radically redefine that distinction between 'ownership' and 'use'. Crucially, a digitally reproducible object need no longer be either 'mine' or 'yours', or even 'owned' by anyone in particular, even under a 'common ownership' license, since a digital 'exchange' transaction can result not in a transfer of exclusive possession or use but the multiplication of identical use possibilities, not just of specific articles but potentially including an identical cloning of the very means of digital re-production.

Incidentally, there is here an analogy, which would have intrigued Aquinas, with the peculiar ontological status of the consecrated bread and wine in the eucharist, which allows multiple simultaneous instances of the 'same' 'transubstantiated' object. Characteristically, Aquinas's own discussion in ST II, 2ae, Q 78, dissecting the logically possible variations upon ownership, use, lending, consuming, et cetera, almost anticipates the dubious money-making character of currently fashionable 'non-fungible tokens'. Aquinas remarked: 'if a man wanted to sell wine separately from the use of the wine, he would be selling the same thing twice, or he would be selling what does not exist, wherefore he would evidently commit a sin of injustice.'

Access to a computer once took the form of logging on through a 'dumb terminal' connected to a mainframe which centrally provided a range of software for use at each local terminal. As personal computers proliferated one could for a while buy or license software in a physical commodity form, a cassette or disk which could load the desired software onto one's own free-standing computer. One could individually 'own' that material form of the software and, perhaps with some ingenuity, freely share it with other users. Later, the dominant commercial mode of distribution became restricted to downloading software directly onto one's own designated computer, in a form difficult to 'share'. More recently, a version of the 'dumb terminal' has in effect re-emerged, with one's own 'personal' computer entirely dependent upon ongoing online access to a 'cloud' service. One no longer 'owns' the software in any physical form but only temporarily rents the use of it.

The commercial model is that of 'rentier capitalism', now an increasingly pervasive aspect of many sectors (see for example *Rentier Capitalism* by Brett Christophers, 2020). Resisting this development, however, there has remained and even flourished the production of 'share-ware', of 'open source' software, of freely distributed programs under 'common license', and so on, though with future such technical possibilities currently restrained by 'copyright' regulation. The primary 'copyright' restriction

remains, of course, that governing currency forgery, itself under challenge from digital money.

It remains the case that, as Aristotle would have insisted, a hacker or programmer is not someone who just make shoes or software but hopefully one (or many) who makes good shoes, appropriately fit for purpose, for actual use. It is also a critical aspect of the emerging 'open' digital economy that 'quality assessment' can be implemented to some extent by automated user-feedback rather than governed by proprietary copyright restrictions, patents and licences, or profit-driven decisions about upgrades, price points, and manipulating demand and supply. There are, obviously, as many problems in such current developments as there are promises or possibilities. This unevenly developing non-commercial digital economy is perhaps still only in its early 16th-century phase. Clearly, digitally enabled production 'for use' is currently more applicable in 'micro' local and consumer or retail sectors, and can hardly apply as yet to major infrastructure projects or large-scale agricultural and basic commodity markets.

We might nevertheless at this point consider other 'exchange' possibilities. We can return to that earlier transformation, and for a moment reconsider the issue of usury**,** the process of lending 'money' at 'interest'. Insofar as that practice constituted a core activity around which some early forms of financial capitalism developed, one might see elements of the present situation as operating in somewhat similar fashion, as reshaping 'existing capitalism' from within towards a post-capitalist system, and it is here perhaps that the digitisation of production and distribution may again be relevant, in the digital production of 'money' itself.

minting

One somewhat forgotten aspect of the cathedral Treasury is that for several centuries the cathedral had its own royally authorised mint and was responsible for producing its 'own' coinage. In effect, banks and other financial institutions are today able to print their own money, in the form of 'leveraging' loans well beyond the nominal value of their actual assets. This constitutes in practice a form of private money creation. (See e.g. Costas Lapavitsas, *Profiting Without Producing*, 2013.) What has been emerging in recent years is the attempt by non-bank and non-governmental entities to create their own digital coinage, their own computing-based currencies, in the form of bit-coining and other versions of 'crypto' money.

So far, these various experiments mainly replicate the current functions of state or bank-issued currency, operating as forms of exchange and account, and able in theory to be transformed into the 'national' forms of currency such as the dollar, though in practice dependent upon volatile fluctuations in the attributed numerical value of a single bitcoin. In the currency markets it is not a reliable equation that one bit-coin equals one bit-coin. Apart from

versions of market speculation, the primary use of crypto-currencies would appear to be money-laundering and tax evasion, and the politically motivated development of non-national currencies generated in the name of 'sovereign individuals', as proselytised by J. D. Davidson and W. Rees-Mogg (*The Sovereign Individual*, 1997) rather than as envisaged by Satoshi Nakamoto (*The Book of Satoshi*, 2014).

Yet insofar as the proliferation of crypto-currencies indicates a loss of 'credibility' or a weakening of shared belief ('credulity') in the present forms of money supply and the operations of the banking and 'financial services' industry, this also opens up the possibility of re-imagining and re-engineering a form of monetary system which might have built into it, for example, the application of smart contract and block-chain technologies designed not to enable but to combat international tax evasion, so that every monetary transaction is indeed traceable in a legal ledger, transparently available for state inspection. What prevents this is not technical limitations but political considerations and interests, including that of commercial 'privacy'.

While the original intended limit and designed 'scarcity' of the first Satoshi bit-coins served a specific purpose (and arguably overlooked the effects of multiple co-existing and competing crypto-currencies), there might be adaptations or variations which ensure the impossibility of an accumulation of potentially 'infinite' wealth which the present financial system enables and which thereby intrinsically generates radical wealth disparities.

That a cathedral once issued its own currency might suggest that a future global system need not be shaped only by competing national currencies of the present kind. The proliferation of digital currencies also suggests alternative versions of, say, Visa credit cards or the PayPal transfer type of system but instead re-designed specifically to provide ways of choosing to invest in, for example, combatting climate change or mitigating economic inequality by automatically directing a percentage levied on all transactions made through, say, a UN-backed global credit card scheme, as the UK Co-op Bank used to offer an Oxfam card. Such a credit 'card' could operate as a personalised voluntary 'Tobin Tax' on all one's transactions.

Keynes once argued for the role of different government bond issues with adjustable interest rates targeted at differently motivated investors, primarily in terms of preferred security or risk factors. Private investment decisions or instructions to a broker can already be shaped by ethical judgements and such considerations could be implemented in, for example, an issue of state 'Premium Bonds' differentiated by similar ethical criteria. Organisations like Oxfam or CAFOD might develop forms of funding in a non-negotiable crypto-currency designed to ensure corruption-free allocation of aid. Such applications might well be regarded as secular equivalents of the buying of 'indulgences' to offset guilty privileges, or to ward off due punishment, or simply as a more practical version of indirectly

'praying' for other people's benefit Though one would surely not brand any such schemes as 'Pa-pal' and they would certainly not be best organised through the Vatican Bank, given its alleged covert operations under Pope John-Paul II, in siphoning laundered money to the Contras in Nicaragua. Perhaps a preferable general brand name might be Gratis, or even Grace.

However, in order to offer some viable alternative to the present 'development agencies' the necessary scale of such initiatives would have to be at least that of 'Peter's Pence', once the peculiarly English version of a nation-wide papal levy upon almost every form of income (see W.E. Lunt, *Financial Relations of the Papacy with England 1327-1534*, 1962). But perhaps this time based upon an awareness that the disparities of income and wealth on a global scale are even more stark than within most national economies and that 'the pound in my pocket', in any global 'exchange', is decidedly of more 'value' elsewhere than its nominal denomination here. At the international scale an inherited 'unequal exchange' is still operative, profoundly distorting the 'value' of money however 'donated'. As earlier argued in relation to local monetary exchanges.

At present the IMF is largely funded by paying commercial-rate returns to private institutional investors drawn mainly from the same 'money market' as national government borrowing. Its ostensible rationale has echoed but considerably modified that of the Marshall Plan. After the Second World War America had an almost uniquely intact productive capacity, perhaps 90% of world manufacturing facilities undamaged by direct military assault. The export markets it needed in the recovering European countries were effectively subsidised to stimulate the emergence of consumer import demands, to the overall benefit of the US economy.

In later decades, the capital inflow to 'developing countries' took the form of dollar loans through the IMF and World Bank (which itself raised that capital by selling interest-bearing bonds to private capital), so that in order to repay or even to service those dollar debts, 'recipient' countries were in effect forced to prioritise dollar-earning export-market production at the expense of their own preferred development strategies. In addition, the 'structural adjustment programs' (SAP) imposed the reduction of government spending, including welfare services and food subsidies, and the privatised selling off of publicly owned assets. The 'assistance' programmes were patently and persistently underpinned by economic theories which depended upon supposedly calculable 'price' mechanisms so that fiscal and monetary policies were forcibly adjusted to consolidate a suitably 'free market' for 'foreign investment'.

Similar 'austerity' programmes were also effectively inflicted on the entire Western politico-economic network in response to global financial crises. After the debt crisis of the 1970s the priority of the World Bank had clearly been to salvage major private banks and investment corporations which through its own programs had invested heavily in 'developing' countries. After the 1989 dissolution of the Soviet Union the priority was precisely to

entrench in Russia such privatised financial structures. Similarly after the 2008 crash the priority was to bail out the leading private financial institutions. There was to be no salvation outside the ark of the WTO. Whether and how this might change is not of course simply a matter of developing alternative economic theories or updating charitable provision to the poor or the pilgrim-refugee at the almonry gate.

John Mihevc in *The Market Tells Them So* (1995) offers an apposite Old Testament comparison with biblical plagues, quoting from a 1991 paper for the Mennonite International Debt Crisis Committee (p. 80):

> Over time, this accumulation of debt has enabled us, like Joseph of Egypt, to place conditions on both a re-scheduling of the debt and on the provision of additional aid. Provided the debt crisis continues for some time, it is expected that we, like Joseph, will be able to demand from some of the low and middle income countries: first the money (Genesis 47:14), then their output (their livestock, verses 16 and 17), then their resources (their land, verse 20), and, finally, their dignity, their culture, their ability to define their own future (the people themselves, verse 21).

In more New Testament or Scholastic terms, you currently need sanctifying grace in order to gain operative grace and a recalcitrant recipient can always have its reserves frozen and assets sanctioned, while delinquents and persistent heretics can be excommunicated from any further input of financial grace, or any access to the world treasury.

grace revisited

So, as a kind of final coda, I obviously need to think a little more about the economy of 'grace'. The late mediaeval papacy could certainly be regarded as the ultimate earth-based representative of the heavenly Treasury, the head office or issuing bank for global indulgences, the financial HQ of the spiritual economy, with churches and monasteries as its local branches, high street outlets, or cash machines. The Vatican was the systemic centre of an extraordinarily ramifying network of financial as well as religious transactions, an international network policed by the threat of excommunication for non-compliance. An apposite parallel today is clearly the World Bank or the International Monetary Fund.

One premise of the overall Christian theological system, as presented for example in the 'biblia pauperum' windows, was the claim that we are all in debt, thanks to 'original sin'. Some have argued that the primary strategy of the IMF has been in practice to keep the entire 'developing' world in permanent debt, and that generally the function of the contemporary financial services global industry is to ensure that we all remain in ongoing and even accumulating debt. The basic mechanism of today's financial

capitalism relies upon continuing debt creation, and at the individual consumer level the central device is the pervasive credit card, which appears to allow perpetual postponement of the cost of temporary indulgence but, most assuredly, no eventual eradication of accumulating penalties. Mediaeval christian belief was formulated in a systematic theology, while the IMF endorses a supposedly coherent economic theory which some would perceive as a variation on ideological fundamentalism.

Let us recap. One familiar version of the core christian doctrine is that we have incurred not only the specific 'debts' or penalties arising from our individual sins but that we were all inescapably born into an overall sinfulness, an inherited 'state' of 'original sin'. The persistent insight or speculation which underpinned the mediaeval concept of wrong-doing was that an individual's sins were related to a fundamental and persistent structural flaw in humanity itself. The story is basically that the first humans disobeyed the injunctions of the deity who had created them and had initially endowed them with a paradisal environment. The penalty for disobedience was unavoidable labour and inescapable death, which we have all undoubtedly inherited. We previously commented on the great west window's depiction of the mortal Adam digging the earth, as the first image in the genealogical sequence of Christ. Stemming from that initial and initiating sin we all remain allegedly in need of 'redemption', of being brought or literally bought out of debt, by a sacrificial atonement, a repayment, a clearing of the inherited obligation.

In mediaeval ideology the apex of all spiritual currency transactions, and the foundational terms and conditions of the entire system, had been established by God himself. Some Old Testament texts stipulated the necessity of regularly sacrificing animals, including the exceptional but possible penalty of sacrificing one's own child, as in the Abraham-Isaac story. The New Testament focussed instead on the countervailing sacrifice of God's own son, partly another test of voluntary filial obedience. It was Christ's redemptive buying back of the primal debt by his sacrifice, a payment in his own precious blood, which enacted a specific one-off exchange of infinite worth, commensurate with an etemal reward, a definitive wiping clean of the books. One influential version of this universal debt system was formulated by Anselm of Canterbury, as in his 'meditation on human redemption', partly quoted earlier:

> For man cannot be restored to that state in which he was first established unless he is made like the angels in whom there is no sin. And that could not be done unless he received forgiveness for all his sins, and that could not be unless he first made entire satisfaction. . . To make such satisfaction it was necessary that the sinner, or someone for him, should give to God of his own something that he does not owe him; and something more valuable than all that is not God. For to sin is to dishonour God, and this no man ought to do, even if it means that

> all that is other than God perish. Immutable truth and plain reason then demand whoever sins should give something better to God in return for the honour of which he has deprived him, that is more than the supposed good for the sake of which he dishonoured him. . . human nature alone could not do this, nor could it be reconciled without the satisfaction of the debt. . . [Christ] took on himself all the debt that sinners ought to pay, and this when he himself owed nothing, so that he could pay the debt for the others who owed it and could not pay.

In the long development of theological meditation on this theme of human debt and divine sacrifice, the central ritual of the Mass had been developed as a form of symbolic but 'real' transaction in which due payment was regularly offered up to the divine in the re-enacted liturgical sacrifice of the divine-human son himself, a redemptive payment for the catastrophically wrong-headed decision of our ancient ancestors, which had left us all in hock.

That misguided and ill-informed speculative gamble by our first parents on the alleged wonders of an exceptional apple (or whatever sales-talk inducement was involved), thereby foolishly trading the security of Edenic obedience for a spurious promise of free god-like status, had disastrously left us all with a permanent if not an accumulating 'debt' which none of the family was ever able to pay off. Which in the end required that extra-special currency of the Lord's own blood to ransom us from a hellish debtors' prison. God was to be paid only by and in his own kind. And it is this transaction which was allegedly perpetuated, repeated, sacramentally re-presented, in every properly validated 'sacrifice' of a Mass.

This narrative shaped other narratives. At the centre of Canterbury cathedral's own sanctuary was another perfectly real body and real blood, that of Thomas Becket, partly displacing as the focus of devotion and popular cult even the sacrifice of bread and wine enacted on the high altar. The shrine commemorated another spectacular act of self-sacrifice, with the shedding of the blood of a martyr as an endorsement of the divine will and commemorated in the present, one upon which the monks could enthusiastically trade. In a different context, Shakespeare's Shylock, the Jewish merchant of Venice, had also to be paid in blood and flesh.

It was upon that central 'sacrificial' transaction of the Mass that the daily life of the monastic prayer professionals structurally pivoted: the seven canonical hours of recitation of psalms and the cycle of readings from both old and new testaments formed a framework which elaborately revolved around the Mass itself. And at the core of the Mass was another mysterious currency transaction or conversion process, the transforming of ordinary bread and wine into a mysteriously manufactured divine-human composite, a crucified God-man.

Actualising or effecting the 'sacrifice' of the mediaeval Mass was not a transaction open to non-professionals, even to most monks. The ordained priesthood formed a privileged confraternity, an exclusive band of brothers whose dealings with the divine were shrouded in both genuinely baffling complexities and seemingly obfuscatory and superficial jargon. As perhaps always when concerned with the mysteries of debt and repayment transactions. However, the claims made for the alleged extraordinary investment returns of financing a Mass for oneself or one's departed loved ones would eventually stretch economic credulity towards a complete collapse of priestly credit. And with it any unquestioning endorsement of the mystery of Christ's 'real presence' in both bread and wine, body and blood, as the underpinning of a sacrifice duly acknowledged and endlessly performed. The post-Reformation Church of England did not much approve of such dubiously miraculous procedures as transubstantiation. Or seem quite to regard the Mass as itself an effective 'sacrifice', bloody or otherwise.

currency

We can pursue the analogies further. At the heart of the mediaeval theological-economic system of inherited debt and sacrificial redemption was not only the exchange of palpable cash for heaven-directed prayer, but a mysterious further currency. The elusive notion of divine 'grace' provided an opaque term that etymologically raises expectations not of economic calculation of debts but of sheer gratuitousness, of a free gift (gratis) rather than a transaction to be earned or paid for, whatever the currency.

However hidden, invisible, and even indefinable 'grace' seemed to be, mere temporal and terrestrial wealth could apparently be handed over in mediated exchange for it, through the intervening currency of priest-celebrated sacraments and monastic prayer, activities sometimes reassuringly visible and audible in the sonorously rolling tones of perpetual chant, the glitter of golden candlesticks with their smoke symbolically wafting prayerful murmurs heaven-wards, the swaying splendour of magnificent robes, the hushed glamour of the officiating High Priest as he performed the exchange on your behalf (in holy Latin, even). An outward sign of inward 'grace'. A very palpable presence of the impalpable. And arguably an enactment of the ultimately unintelligible.

These tangible acts of 'grace' were, it seemed, only the face of the coin. What was being transferred, or allocated, or attributed, or imputed, or credited, in the divine balance-sheet of our spiritual state of health, was not the prayers themselves but the 'grace' they induced, or merited, or earned, or represented – the precise terms of the contract were opaquely flexible and endlessly glossed by theological experts.

Quite what that transmitted 'grace' consisted of and how exactly it operated might remain as indecipherable to the ordinary prayer punter as

the slippery and opaque claims made today by investment advisers concerning a fail-safe opportunity to amass untold riches through an exotic and inexplicable financial instrument. Do we ordinary punters need to understand what the appropriate trading currency is for an internationally issued deferred credit default swap, or even grasp quite how a seasonal black tulip can be suddenly very valuable? Or, to suggest themes for later exploration, how a byte can operate as a unit of value, or digital ones and zeroes somehow add up to a viable coinage? The divine allocation of 'grace' might seem as mysteriously arcane as, say, the secretive investment procedures of Warren Buffett's equity fund or the algorithm-led dynamic pricing of Amazon and the travel industry. Yet all you had to do in order to benefit was, in effect, to press the right buttons, perform the correct actions, click on the appropriate icon..

It is an interesting but very frustrating exercise to search for a coherent, consistent, and shared definition of 'grace' across a representative sample of theological writers from the patristic period to the present. Formulations range from the almost physical or material, in which grace is somehow palpably 'dispensed' by the sacraments, to the near-vacuous, in which 'grace' is somehow both the very 'life' of the Trinity itself and a kind of loose synonym for such terms as 'blessing', 'gift', 'favour'. At the core of the Latin-speaking 'divine economy' was an ambivalent and complex notion that derived from the term '*gratia*' as primarily meaning 'gift', most often interpreted as God's own giving, including even his somehow giving of his very self, so that the recipient of grace 'participated' in the divine 'life'. This 'grace' could sometimes seem a strange type of substance which could be shared, received, and even consumed, by undertaking specific operations, such as 'participating' in the sacraments which 'dispensed' grace, or perhaps even simply by praying. Grace could, in some contexts, be 'awarded' or 'imputed' or even 'earned', though any such assertions were the subject of fierce disputes throughout the mediaeval and especially Reformation period. It is worth pursuing the term a little more.

full of grace

The most familiar appearance of the term itself was in the 'Ave Maria', the 'Annunciation' of the Angel Gabriel to the Virgin Mary, announcing her miraculous pregnancy: 'Hail, full of grace, the Lord is with thee, blessed art thou amongst women.' In almost the last sermon Aquinas delivered, just before his death, he provided a commentary on the 'Hail Mary'. Noting that it is usual in the Old Testament for a visiting angel to be accorded respect, Aquinas glosses:

> [an angel] was preeminent because of the fullness of the splendour of divine grace: for angels partake most fully of the divine light. (Job 25:3: Is there any numbering of his soldiers, and upon whom shall not his

> light arise?) Therefore [the angel] always appears with light. But men, although they partake something of the light of grace, it is but little, and with obscurity. Therefore it was not fitting that the angel should show reverence to man until someone should be found in human nature who exceeded the angels in those . . respects. And this was the Blessed Virgin. In order to signify that she exceeded him in these . . things, the angel wished to show her reverence; hence he said, "Ave". So the Blessed Virgin exceeded the angels in . . fullness of grace, which the Blessed Virgin has more than any angel. It was to indicate this that the angel showed her reverence, saying, "full of grace", as if to say: I will show you reverence because you excel me in the fullness of grace.

Aquinas elaborates at characteristic length, but I will select:

> . . the Blessed Virgin is full of grace with respect to three things. First, with respect to soul, which has every fullness of grace. For the grace of God is given for two reasons, namely, in order to act well, and to avoid evil. And with respect to these two the Blessed Virgin had most perfect grace. For more than any other holy person save Christ alone she avoided all sin.
> . . For we know that more grace was brought together in her to conquer sin from every side that she merited in order to conceive and give birth to him in whom there was no sin.
> . . it is a great thing in any saint that he has so much grace that it suffices for the salvation of many, but when enough is had for the salvation of all the men in the world, this is the greatest, and so it is with Christ and with the Blessed Virgin.
> . . She is full of grace, therefore, and exceeds the angels in fullness of grace, and because of this she is fittingly called Mary which means illumined in herself, hence Isaiah 58:11: 'and will fill the soul with brightness; and she will be a light for others.'
> . . she was full of grace with respect to the overflow of soul to flesh or body. For it is a great thing for the saints to have enough grace to sanctify their soul; but the soul of the Blessed Virgin was so full that from it grace flowed into her body, in order that with it she might conceive the son of God.

On this reading, 'grace' can be a light, even an 'inner light' or 'divine light', and one person can be 'more full' of it than another person, so that some people 'partake' of the 'light of grace' but only a little, and 'with obscurity', while another has 'every fullness of grace', even 'most perfect grace', which can so 'overflow' the soul that it 'flows' into the body, and moreover since she is 'illumined in herself' she will also 'be a light for others', presumably somehow overflowing into them.

It is worth remarking, however, that some commentators see the angel's phrase in Luke 1: 28 rather more simply, as almost a kind of pun. The Greek reads:

καὶ εἰσελθὼν πρὸς αὐτὴν εἶπεν χαῖρε, κεχαριτωμένη
And coming in towards her he said: 'greetings greatly favoured'.

The **χαῖρε** (*kaire*) is a respectful 'hello' while the **χαρι-** (*kari-*) in the following adjective indicates being 'blessed' or 'fortunate'. It was arguably the Latin Vulgate, with the translation 'ave gratia plena', which inserted the notion of something which one can be 'full of' (*plena*), and in doing so partly lost the play on words. But then nicely translated **κεχαριτωμένη** as 'benedicta', itself almost a play on the standard Christian greeting of 'benedicite'.

κατὰ χάριν

*

It is worth taking a short side amble. Which involves examing this elusive term in some detail. Take it slowly, or ignore. The word 'grace' does not otherwise appear at all in the Synoptic Gospels, but its extensive use in Paul's letters is more problematic. For example, in *First Corinthians* 1:3 it is clearly a familiar form of greeting: 'Grace to you and peace from God our Father and the Lord Jesus Christ' (χάρις ὑμῖν καὶ εἰρήνη ἀπὸ θεοῦ πατρὸς ἡμῶν καὶ κυρίου Ἰησοῦ Χριστοῦ), using that same root χάρις, and Paul's phrase is usually given in a Latin translation as 'gratia vobis et pax', which could mean simply 'thanks to you and peace'. In the next verse χάρις occurs within the everyday verb for 'giving thanks' (Εὐχαριστῶ τῷ θεῷ - I thank God), which the Latin translates in the commonplace phrase 'gratias ago Deo' ('thanks be to God'), but Εὐχαριστῶ is also the Greek word used for the 'Thanksgiving' known later as the 'Eucharist'.

What Paul 'gives thanks' for is 'τῇ χάριτι τοῦ θεοῦ τῇ δοθείσῃ ὑμῖν', the *karis* (gift) given to you by God, or in Latin 'gratia Dei quae data est vobis'. By verse 7 Paul has also referred to the χαρίσμα (*karisma)*, using the same root *karis*, but now familiar as the English word 'charisma', sometimes translated as 'spiritual gift' and in the Vulgate as simply 'gratia'. In the 12th chapter Paul elaborates on the notion of different 'charisma' or special gifts: 'Διαιρέσεις δὲ χαρισμάτων εἰσίν, τὸ δὲ αὐτὸ πνεῦμα', and again the Latin favours the term 'grace' ('*divisiones vero gratiarum sunt idem autem Spiritus*') while the context indicates an allocation of functions: 'Now there are diversities of graces, but the same Spirit'.

I won't even try to explore the relation between 'karis' as grace and its use in the root of 'caritas' or 'charity'. But to further complicate matters, Paul concludes *First Corinthians* in chapter 16 by speaking of the financial collections (λογείας) he has been making. He calls them θησαυρίζων

(treasures) and then promises to take 'τὴν χάριν ὑμῶν εἰς Ἰερουσαλήμ', that he will now convey 'your gifts' to Jerusalem. Their donation of money is a thank-you gift, clearly a financial contribution, but is it also a 'grace'?

A fuller exploration of the theology of 'grace' in Paul's letter to the Romans might begin from simply registering the several different uses and senses of the word itself. But I want only to draw attention to the difficulty of deciding what is being referred to. Consider *Romans* 1: 5-8, in the Greek, Latin, and English:

> **δι' οὗ ἐλάβομεν *χάριν* καὶ ἀποστολὴν εἰς ὑπακοὴν πίστεως ἐν πᾶσιν τοῖς ἔθνεσιν ὑπὲρ τοῦ ὀνόματος αὐτοῦ,**
> *per quem accepimus gratiam et apostolatum ad obediendum fidei in omnibus gentibus pro nomine eius.*
> By whom we have received *grace* and apostleship for obedience to the faith, in all nations, for his name:

Here the term *χάριν* is associated with both a specific function and a claim of exceptional honour, akin to a charisma, but syntactically somewhat opaquely related (εἰς, *ad*, for) to both obedience and faith. In 1:11 some kind of 'charisma' is now to be imparted to others by or through Paul :

> **ἐπιποθῶ γὰρ ἰδεῖν ὑμᾶς, ἵνα τι μεταδῶ *χάρισμα* ὑμῖν πνευματικὸν εἰς τὸ στηριχθῆναι ὑμᾶς,**
> *desidero enim videre vos ut aliquid impertiar gratiae vobis spiritalis ad confirmandos vos*
> For I long to see you that I may impart unto you some spiritual *grace*, to strengthen you:

In 3:23-24 the Latin makes more explicit a verbal association between 'free' (*gratis*) and grace (*gratia*) which is a not as present in the Greek or English:

> **πάντες γὰρ ἥμαρτον καὶ ὑστεροῦνται τῆς δόξης τοῦ θεοῦ, δικαιούμενοι δωρεὰν τῇ αὐτοῦ *χάριτι* διὰ τῆς ἀπολυτρώσεως τῆς ἐν Χριστῷ Ἰησοῦ·**
> *omnes enim peccaverunt et egent gloriam Dei iustificati gratis per gratiam ipsius per redemptionem quae est in Christo Iesu.*For all have sinned and do need the glory of God. Being justified *freely by his grace*, through the redemption that is in Christ Jesus,

Romans 4:4 indicates some underlying relation between 'debt' and 'grace' but the analogy or metaphor of working for wages leaves the compressed phrase κατὰ χάριν almost indecipherable:

τῷ δὲ ἐργαζομένῳ ὁ μισθὸς οὐ λογίζεται κατὰ χάριν ἀλλὰ κατὰ ὀφείλημα·
ei autem qui operatur merces non inputatur secundum gratiam sed secundum debitum
Now to him that worketh, the reward is not reckoned *according to grace* but according to debt.

Romans 5.15f further complicates how χάρισμα, χάρις, and χάριτι, are to be connected, as the clumsy or convoluted attempts at translation make plain:

Ἀλλ' οὐχ ὡς τὸ παράπτωμα, οὕτως καὶ τὸ χάρισμα• εἰ γὰρ τῷ τοῦ ἑνὸς παραπτώματι οἱ πολλοὶ ἀπέθανον, πολλῷ μᾶλλον ἡ χάρις τοῦ θεοῦ καὶ ἡ δωρεὰ ἐν χάριτι τῇ τοῦ ἑνὸς ἀνθρώπου Ἰησοῦ Χριστοῦ εἰς τοὺς πολλοὺς ἐπερίσσευσεν.
sed non sicut delictum ita et donum si enim unius delicto multi mortui sunt multo magis gratia Dei et donum in gratiam unius hominis Iesu Christi in plures abundavit.
But not as the offence, so also *the gift*. For if by the offence of one, many died: much more *the grace of God* and *the gift, by the grace of one man*, Jesus Christ, hath abounded unto many.

In paying attention to the complexities of Paul's notions of the relationship between grace, justification, merit, and works, it is possible to slide over the complex question of what his core term actually and very variously refers to.

By the time of the prologue to the gospel of John 'grace' can be used four times in the space of three verses (John 1: 14f), but now as a taken-for-granted generic but undefined and unexplained notion, in effect simply indicating the entire realm of the new creation, of 'grace and truth' rather than sin and death. The term is never used again in John's gospel, nor in Mark and Matthew.

> And the Word was made flesh and dwelt amongst us and we beheld his glory, the glory as of the only begotten of the Father, full of *grace* and truth. . . and of his fullness we have all received, and *grace from grace*. For the Law was given by Moses , but *grace* and truth came by Jesus Christ

In effect, as I have very briefly indicated, the Greek term *karis* and its variants can figure almost as a simple greeting, as in 'thanks be to God', but can also modulate into the notion of a 'thanks-giving', which itself comes to describe a specific practice of worship. At the 'eu-charistic' (thanks-giving, celebratory) Passover supper, Christ 'gave thanks' for the bread, a gesture of 'gratitude' but also regarded as a divine 'blessing' of the bread, a sacrifice, a making-sacred. Which in turn becomes in the Mass an act of transforming

the host into a sacred object, to be both consumed and regarded as a 'means of grace'. Expressing 'grateful thanks' can become an assertion of being 'full of grace'.

What arguably happened in the development of these early Christian writings is in part a hypostatisation whereby 'grace' takes on the characteristics not only of a quality or a process, an act of free giving and reception, but almost of a substance or object existing quasi-independently in a form of circulation, of overflowing, of being handed on and transmitted, and also as an attribute of a person, including a particular role or function within the early Christian community. Which can in turn, eventually, support the notion of a special class of Christians, with not just a particular 'charisma' but a 'vocation' confirmed in an ordination, an endowment of a sacramental character or special grace. Which then justifies making collections on their behalf, and eventually paying for their prayers.

Aquinas

Later, in the Scholastic elaboration of a theology of 'grace' what can be seen emerging is a form of systematic theory. But of what? As an outstanding example, in several *quaestiones* in the *Summa Theologiae* (1a2ae QQ 106-114) Aquinas focuses on this elusive and enigmatic concept of 'grace' which fuelled so much mediaeval and later controversy. With characteristic concision and insight, Aquinas anticipates much of the Reformation disputes, primarily by asking questions derived from his own close reading of the Pauline texts, regarded almost as a jigsaw of texts to be fitted together.

A sample of his questions: without God's grace can a man do or wish any good, can he keep the commandments of the Law, can he prepare himself for grace? Is God alone the efficient cause of grace? Is any disposition towards grace needed on the part of the recipient, by an act of free-will? Whether such a disposition can make grace follow of necessity? Whether anyone may know that he has grace? Whether grace is a quality? Whether grace differs from infused virtue? Whether grace implies something in the soul? Whether grace is in the essence of the soul as in a subject, or in one of the powers?

It is worth considering part of the answer to that last question, with its cross-references to other components of the overall inquiry :

> . . if grace is the same as virtue, it must necessarily be in the powers of the soul as in a subject; since the soul's powers are the proper subject of virtue, as stated above (Question 56, Article 1). But if grace differs from virtue, it cannot be said that a power of the soul is the subject of grace, since every perfection of the soul's powers has the nature of virtue, as stated above (Question 55, Article 1; Question 56, Article 1). Hence it remains that grace, as it is prior to virtue, has a subject prior to

> the powers of the soul, so that it is in the essence of the soul. For as man in his intellective powers participates in the divine knowledge through the virtue of faith, and in his power of will participates in the divine love through the virtue of charity, so also in the nature of the soul does he participate in the divine nature, after the manner of a likeness, through a certain regeneration or re-creation.

We are right back to why humankind lost its initial almost angelic status, its 'super-natural' powers and why we now require divine assistance, and the payment of a debt, to recover.

In *Quaestio* 114 Aquinas himself suggests or indicates an analogical link between the theology of grace and economic theory, the circulations of merit and value. As usual, Aquinas poses a question and then outlines contrary arguments before providing his own response. He asks: 'Whether a man can merit anything from God?' On the one side:

> whoever merits anything from another makes him his debtor; for a man's wage is a debt due to him. Now God is no one's debtor; hence it is written (*Rm.* 11:35): 'Who hath first given to Him, and recompense shall be made to him?' Hence no one can merit anything from God.

On the contrary:

> It is written (*Jer.* 31:16): 'There is a reward for thy work.' Now a reward means something bestowed by reason of merit. Hence it would seem that a man may merit from God.

As we shall see shortly, Aquinas's thinking here is deeply shaped by the questions once put by Aristotle:

> I answer that, merit and reward refer to the same, for a reward means something given anyone in return for work or toil, as a price for it. Hence, as it is an act of justice to give a just price for anything received from another, so also is it an act of justice to make a return for work or toil. Now justice is a kind of equality, as is clear from the Philosopher (*Ethic.* v, 3), and hence justice is simply between those that are simply equal; but where there is no absolute equality between them, neither is there absolute justice, but there may be a certain manner of justice, as when we speak of a father's or a master's right (*Ethic.* v, 6), as the Philosopher says. And hence where there is justice simply, there is the character of merit and reward simply. But where there is no simple right, but only relative, there is no character of merit simply, but only relatively, in so far as the character of justice is found there, since the child merits something from his father and the slave from his lord.

> Now it is clear that between God and man there is the greatest inequality: for they are infinitely apart, and all man's good is from God. Hence there can be no justice of absolute equality between man and God, but only of a certain proportion, inasmuch as both operate after their own manner. Now the manner and measure of human virtue is in man from God. Hence man's merit with God only exists on the presupposition of the divine ordination, so that man obtains from God, as a reward of his operation, what God gave him the power of operation for, even as natural things by their proper movements and operations obtain that to which they were ordained by God; differently, indeed, since the rational creature moves itself to act by its free-will, hence its action has the character of merit, which is not so in other creatures.

He then interestingly goes on to ask: 'Whether temporal goods fall under [the category of] merit?' A question for any debate about economic justice.

My concern at the moment lies not with his answers but with his way of thinking, his model. Aquinas here suggests or indicates at least an analogical link between the theology of grace and 'economic theory'.

analogies

Given the overall theological frame sketched earlier, there is an obvious overlap in the thematic content of both terrains, in that the issues of debt and redemption, or credit and repayment, as well as justice and equality, can figure in both modes of inquiry.

However, what seems to me most salient is that a systematic theology of grace almost necessarily constructs a kind of flow diagram in which that elusive entity 'grace' is regarded as circulating within the 'divine economy' (a commonplace mediaeval term) and in doing so is transformed into or takes on different modes of existence, or forms of operation. As we have briefly seen, the word 'grace' was semi-systematised, in the pseudo-Pauline writings and by later commentators, in terms of various quasi-metaphors: sometimes suggesting a hydraulic model of flowing, or a shining light, eventually almost an electrical type of infusion or charge, later even invoking a kind of storage battery, a reservoir of grace, a Treasury.

This process of hypostasisation was not unlike similar transformations of the Freudian concept of 'drive' or indeed of psychic 'energy'. And, most appositely in our context, the treatment of the core notions of 'value' and 'price' in classical and neo-classical economic theory. Or even the very notion of 'Das Kapital' itself, with its elusive self-transformations and circulations, variously taking on the analytical forms of money, investment, returns, profit, surplus value, both an object and an attribute, a process and a product, a shape-shifting creature, both pervasive and conceptually fluid, whereby activities become nouns and processes become objects, so that in

some contemporary modulations 'wage inflation' or a 'pension increase', the 'balance of payments' or a 'collateral debt crisis', become like tokens to be moved around a counting-house chequered-cloth or chess-pieces shunted on a board.

In other words, in the notions of economic circulation and transformation of 'value' we can see an analogue of an earlier deeply familiar attempt to make sense of a circulation of 'grace' in the divine economy, with both concepts oscillating between an object or process, an entity or action.

There have been many studies of the relationships between 'religion and the rise of capitalism', most notably Max Weber's influential *The Protestant Ethic and the Spirit of Capitalism* and the numerous books published in its wake. The emphasis has sometimes been upon claims that changes in Reformation belief and sensibility helped shape a new 'Protestant' attitude towards money-making and entrepreneurship, thereby reinforcing psychological motivations for hard work, and so on. There is however a somewhat different aspect of the relationship which I want tentatively to explore, if only as a minor 'grace note' to those more substantial investigations.

There is, I want to suggest, a degree of parallelism and even overlap between the kind of systematic theory eventually generated to try to understand the concept of grace and later attempts to clarify and systematise the central notions deployed in the developments of 'economic theory'. Moreover, the process of constructing a theological theory is traditionally that of reconciling individual text fragments in the Bible and other authorities with each other, by treating them as if they were similar kinds of statement, compatible jigsaw pieces in a single puzzling image. Aquinas's procedure was to see how they might all be fitted together. Which ones were relevant was partly a matter of acknowledging previous discussions and uses of those texts. One might say the same of the history of 'economic theory'.

It is time to reverse the direction of this set of considerations on the Treasury. I have tried, in a semi-facetious way, to apply some familiar modes of modern economic thinking to the curious practice of being paid to pray. Yet that tongue-in-cheek approach is meant, conversely, to indicate some serious underlying problems about what is now called economic theory.

I certainly didn't intend to offer my own 'economic theory' of paid prayer, but rather to have scrutinised some aspects of economic theory itself, by considering a series of interweaving issues prompted by thinking about the Cathedral Treasury.

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A concluding consideration: as indicated earlier, the exterior 'ground floor' of the Treasury building acted as a ceremonial passageway to the monastery's cemetery. The connection between the dead and the monastic economy is clear: a large part of the endowments financing the monastery derived from long-past inheritances and bequests from the dead. It was a major function of the monastic liturgical routine to commemorate the dead, particularly the donors.

In many ways it is the inheritance of the dead upon which any economic system is constructed. Among the accusations of injustice directed against the present capitalist system is that the previous collective accumulation of manufacturing and trading assets is still perpetuated as private inherited wealth, for example from the proceeds of the slave trade.

An emphasis for any transformed society might be upon the process of recycling and re-using not only our current material 'waste' but every global asset we have commonly inherited, including ensuring that the total intellectual inheritance of the past can and should be freely available to the future. This is not primarily a matter of revising the ownership or copyright status of cultural works but crucially of the patents to scientific and other inventions which increasingly can be artificially and profitably extended by filing updates and minor modifications. Insofar as the practice of making documents and other creative artefacts available under a 'commons' license can act as a model, one might see the publicly funded development of deliberately copyright-free inventions, patents, production designs, as well as software and operating systems. An extension of the 'open source' model of software.

One of the constitutive components of the Benedictine monastic Rule was a vow of poverty, taken by each professed monk, which arguably meant not simply making a charitable donation to the existing poor or even committing oneself to personal poverty but rather making 'poverty' a characteristic of the community and its overall way of living.

It may now take a miracle to save the planet or develop a post-capitalist world, and we might be tempted simply to say a forlorn petitionary prayer or attempt merely palliative treatement for both.

However, given my comments about prayer during this set of considerations it should be noted that my failure to make much sense of prayer is not entirely idiosyncratic. The profoundly problematic nature of the act of praying is posed not only by theological sceptics, but in some of the more impressive writings on the subject by committed practitioners.

For example, the renowned German Catholic theologian Karl Rahner was remarkably candid in his indicatively entitled *Encounters With Silence:*

> How can a man hope to speak with You? You are so distant and so mysterious. When I pray, it's as if my words have disappeared down some deep dark well, from which no echo ever comes back to reassure me that they have struck the ground of Your heart. Lord, to pray my whole life long without hearing an answer, isn't that too much to ask? (p. 19)
>
> Every time I try to pray, I am doomed to wander in the barren wastes of my own emptiness, since I have left the world behind, and still cannot find my way into the true sanctuary of my inner self, the only place where You can be found and adored. Doesn't your loving sympathy make you understand that, when I am shut out from the place where you live and banished to the market-place before Your Cathedral, I unfortunately fill up this market with the busy distractions of the world? Doesn't Your mercy make you understand that the empty clatter of these distractions is far sweeter to me than the grim and forbidding stillness when I try to pray? This awful quiet is the sole result of my futile efforts at prayer, since I deliberately shut out the noises of the world, and yet I am still hopelessly deaf to the eloquent sounds of Your silence. (p. 23)

And here is the Dominican theologian, Herbert McCabe, in a short sermon on prayer (*God Christ and Us*, 2003, p.106-7):

> Can we put pressure on God so that he changes his mind? No, of course we cannot. But the very question comes from thinking of prayer as something that starts from us, which it does not. Like everything else, it starts from God. It is God who decides that we shall pray. And it is God who answers our prayer, giving us what we ask for or more than we ask, but never less than we ask.
>
> 'But surely' (you might say), 'if God decides that we shall pray then our prayer cannot be something that comes freely and spontaneously from us. We may think that we are acting freely when we pray, but, in reality, we must be just puppets of God.'
>
> It is natural to think along these lines. But that is because it is hard to think of God but easy to think of the gods. If God were one of the gods, a powerful, the most powerful, inhabitant of the universe, then if we did what *he* decided we should indeed not be doing what *we* decided. We should be his puppets, manipulated from outside by another being.
>
> But God is not an inhabitant of the universe. He is not another being alongside us and competing with us. God the Creator is author of the entire universe and of all that is in it. He is so far *outside* it that he is *in* every bit of it while not himself being a bit of it. He is not one of the beings. He is *within* every being keeping it in being. He is within you making you to be you. What you do freely you do from the depth

> within you that is yourself. But you also do it from the even greater depth within you that is God making you to be yourself. There are things in our universe that are not free but always moved by other things. And there are things like ourselves that are sometimes *not* determined by other creatures but are free. But God is the author of them all. Everything we have is God's free gift to us.

Which is a variation on Pecham's argument concerning contingency but combined with a 'gift' of being 'free'. But what would an economy of free gifts look like?

I may not be convinced but, clearly, thinking about prayer leads directly to thinking about 'God'. We can now continue around the cathedral ambulatory and visit the parallel chapel to the Treasury on the other side of the sanctuary. It is dedicated to Saint Anselm, whom we previously considered at some length in relation to Eadmer's history, and who, among other achievements, is sometimes credited with almost re-inventing the practice of 'meditative' personal prayer. As some well-earned relief from the sophisms of 'economic theory' we can instead consider the peculiar rigour of Anselm's idiosyncratic 'ontological proof'. Perhaps with a *quaestio* in mind: is there still a God to think about, and what does it mean to 'think' anyway?

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ctd...

Canterbury Cathedral, proclaimed a six-year old visitor,
is 'a big building full of stories' and 'it smells of history'.

It's also a World Heritage Site attracting thousands of tourists
who briefly wander around, take photos, and leave.
Probably impressed, and admiring, but often puzzled.

In a short visit it's hard to pin down the 'half-formed thoughts'
and elusive responses the cathedral can prompt or provoke.

Perhaps about history, time, death, the past, but also about
art, science, money, philosophy, belief, politics, and why
for a thousand years monks spent most of their time singing.

This second part considers why the cathedral windows
were deliberately smashed, how modern science is related to a
Franciscan archbishop who studied optics, and how
monks praying for money anticipated modern economics.

The cathedral is large, and this essay has grown as I have tried
to get some of my own 'half-formed thoughts' into focus. .
Here you can take your time, to browse, skip, pause,
and consider your own thoughts.

Enjoy your visit.

Bernard Sharratt lives in Canterbury
and has had to show friends round the
Cathedral for nearly fifty years.
And still doesn't quite know
what he thinks about it.